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STAPHYLOCOCCAL INFECTION IN HOSPITAL NURSERIES INFLUENCE OF THREE DIFFERENT NURSING TECHNIQUES*

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DURING THE LAST decade or so a wave of staphylococcal infections has swept through hospitals all over the world, and nurseries have been hit particularly hard. The hospitals of the province of Quebec have not been spared. In 1950, Denton, Kalz and Foley[1] reported the results of a study during an epidemic of staphylococcal infection in the wards of a Montreal hospital nursery. At the time, the impact of staphylococcal infections in Quebec nurseries was such that several of them had to be closed temporarily.

The frequency and mode of transmission of staphylococcal infection and the underlying epidemiological factors have, over the course of only a few years, acquired the status of major problems which have been tackled by public health research and have been the subject of many publications.[2-22, 25-78]

The present article deals with only one aspect of the few experimental and epidemiological investigations on staphylococcal infections which have been carried on for several years by the Institute of Microbiology and Hygiene of the University of Montreal in collaboration with various hospitals and public health institutions in the province of Quebec. It concerns more particularly the prevalence of such infections, not merely in a single nursery, but in those of several hospitals in the province of Quebec. It also deals with the influence of nursing technique (bathing, and transferring the newborn infants out of and into the nursery, scrub technique of the staff and products used to this end) on the incidence of staphylococcal infections.

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METHOD

Our survey was conducted from July 1954 to July 1956 in the nurseries of 26 hospitals in the province of Quebec, 12 of which were located on the Island of Montreal and the others in various regions of the province. At the time of the study, the staphylococcal epidemic could be said to have abated in these nurseries.

We visited personally each of the nurseries, accompanied by the head physician and the nurse in charge, and we recorded on a form our observations and the following points:

1. Location of the nursery in the hospital, layout of surroundings, presence or absence of a corridor and isolating ante-room at the entrance; maintenance of the premises: washing of floors, walls, ceilings, etc.

2. Technique of caring for the infants: wearing of a mask, gown and gloves by the personnel, washing or disinfection of hands before handling of each infant; method and equipment used for bathing the newborn and products used to this end; transferring of babies out of and into the nursery.

Our visit ended with a survey of all cases of staphylococcal infection observed during the preceding year. In several hospitals, we had to examine systematically the records of all newborn infants to determine the exact number of infections which had occurred. We found frequently that no record had been kept or that the records were incomplete. It was therefore impossible to establish any statistics for the previous year. In order to correct this situation, a special form was drawn up and supplied to all the hospitals visited. This form was to be attached to the file of each child and returned to us at the end of the year, the second one of the present investigation. Figures presented here are those obtained during this second year. In all hospitals, newborn infants were kept in the nursery from four to six days before discharge. In another study, to be published in the near future, we noted the number of cases of infection which occurred after discharge from the hospital.

We also made a bacteriological study of the environment, skin and respiratory tract of the personnel, mothers and infants. These results will be published separately. The practically uniform incidence of staphylococcal carriers among the personnel of various nurseries with different rates

TABLE I.

Hospital	*Number of births (1956)*	*Number of cases*	*%*	*Infants bathed on single table*
A_7	1231	0	0	No
A_8	2000	2	0.1	Yes
A_{11}	2760	3	0.1	No
E_3	800	2	0.25	Yes
I_3	1148	4	0.35	No
A_6	1175	11	0.9	Yes
G	936	10	1.07	No
I_1	1611	25	1.55	Yes
I_2	782	20	2.56	No
D	1966	53	2.7	Yes
A_1	299	9	3.0	No
A_5	388	15	4.4	Yes
E_2	1007	47	4.7	No
Total	16,053	201	1.25%	

of infection would seem to indicate that in our study this factor has had little bearing on the frequency of infection in any particular group.

We had to be satisfied with the results obtained in only 13 of the hospitals and had to discard the others, as some of the institutions were unable to fill in the forms or, for unknown reasons, discontinued filling them in after a few months.

There were no deaths attributable to the infection in question. The etiological diagnosis accepted by us in the case of skin abscesses and pustules was based on bacteriological, epidemiological or clinical examination. In diarrhœa and conjunctivitis, only the bacteriological diagnosis was taken into consideration. Two instances of bronchopulmonary complications were reported.

RESULTS

Out of 16,053 births which occurred in these 13 hospitals, 201 cases of staphylococcal infection were reported, an average of 1.25% (Table I), with a range of 0 to 4.7%.

The nurseries for the newborn in all these hospitals are separated from the other departments by a corridor, and most of them have an ante-room. The pædiatric department is located either on a different floor or in a distant wing. No visitors are admitted into the nurseries, and attending physicians can see their patients only in the ante-room, after having scrubbed their hands and donned surgical garb. All these premises are kept scrupulously clean. Most of the staff, except the supervising nurse, consists of nursemaids and of student nurses.

The number of infants per nursery varies from 8 to 20; the beds are about 2 feet (60 cm.) apart, except in one hospital where 4-crib units (A_5 in Tables) are used. In half the hospitals, a single table is used, covered with a sterile towel for washing each infant; in the remaining hospitals, each infant is washed in his own bed. None of these hospitals require the staff to wear gloves, but in most of them a mask and gown must be worn in the nursery.

The outstanding differences between hospitals relate to the care of the infants, particularly on the three following points: transferring the babies out of and into the nursery; scrub technique; bathing of the newborn and products used to this end.

1. *Transferring the Babies Out of and Into the Nursery* (Table II)

During our visits we were astonished to see how freely, in some hospitals, the newborn were carried out among visitors and the hospital staff, sometimes from one floor to another, to show them to their mothers or for christening. In some places, christening even takes place in church and the infants are returned to the nursery after the ceremony. The incidence of infection found in these hospitals is indicated in Table II, under the heading "infants".

In other hospitals, only the breast-fed infants are allowed to be taken out of the nursery. The incidence of infection in these institutions is indicated under the heading "nursing infants" in Table II.

The third group in Table II, "isolated infants", represents the hospitals where babies remain in the nursery from birth until discharge. They are not removed. Breast-fed infants are kept in a separate nursery.

The incidence of infection in hospitals where all the babies or only some of them are transferred out of and into the nursery is very similar, namely, 1.5% and 1.92%. In contrast, in hospitals where babies can on no account be taken out of the nursery, the incidence of infection is only 0.1%, or 10 or 15 times less. The incidence of infections

TABLE II.—INFLUENCE ON THE RATE OF STAPHYLOCOCCAL INFECTION OF TRANSFERRING INFANTS OUT OF AND INTO THE NURSERY

*"Infants"**				*"Nursing infants"**				*"Isolated infants"**			
Hospital	*No. births*	*No. cases*	*%*	*Hospital*	*No. births*	*No. cases*	*%*	*Hospital*	*No. births*	*No. cases*	*%*
A	299	9	3.0	A	338	15	4.4	A	2000	2	0.1
D	1966	53	2.7	A	1231	0	0.0	A	2760	3	0.1
I	1148	4	0.35	I	1611	25	1.55				
G	936	10	1.07	I	782	20	2.56				
E	800	2	0.25	A	1175	11	0.9				
				E	1007	47	4.7				
Total	5149	78	1.51		6144	118	1.92		4760	5	0.1

*See text for definition of terms.

TABLE III.—INFLUENCE ON THE RATE OF STAPHYLOCOCCAL INFECTION OF THE PRODUCT USED BY THE NURSES FOR HAND WASHING

	No washing				*pHisoHex*				*Soap*				*Dettol*			
	Hospital	*No. births*	*No. cases*	*%*	*Hospital*	*No. births*	*No. cases*	*%*	*Hospital*	*No. births*	*No. cases*	*%*	*Hospital*	*No. births*	*No. cases*	*%*
"Isolated infants"					A_{11}	2760	3	0.1	A_8	2000	2	0.1				
"Nursing infants"	A_6	1175	11	0.9					A_7	1231	0	0.0	A_5	338	15	4.4
	E_2	1007	47	4.7					I_1	1611	25	1.55				
			Mean	2.65					I_2	782	20	2.56				
											Mean	1.24				
"Infants"	A_1	299	9	3.0					I_3	1148	4	0.35	D	1966	53	2.7
													G	936	10	1.07
													E_3	800	2	0.25
															Mean	1.75
Total.....		2481	67	2.70		2760	3	0.1		6772	51	0.75		4040	80	1.9

among "isolated infants" is therefore very significantly lower (chi-square criterion, level less than 0.1%) than the average incidence in the two other groups, "nursing infants" and "infants".

2. *Scrub Technique* (Table III)

In the study of the effect of personnel scrub technique, we took into account the fact that transferring infants out of and into the nursery affects the incidence of infection. For that reason, in order to bring out possible interaction between the two factors of scrub technique and transfer, we have in Table III divided each of the above-mentioned three groups of infants into four subgroups with the following policies: (1) nurses and nursemaids do not wash their hands before handling each baby; (2) pHisoHex (hexachlorophene) is used; (3) hands are washed with soap; and (4) personnel dip their hands in Dettol (parachloro-metaxylenol) solution before handling each baby.

In the group of "isolated infants", the only possible comparison is between the use of pHisoHex and that of soap: no appreciable difference is noted.

In the group of "nursing infants", a very significant difference of from 1.24% to 4.4% (chi-square criterion, level less than 0.1%) is found in favour of soap over Dettol, but no significant difference between no washing and the use of Dettol. It would therefore appear that the use of soap is preferable to no washing or merely dipping in Dettol.

In the group of "infants", the same statistical analysis leads to similar conclusions.

3. *Technique of Bathing the Infants* (Table IV)

In some hospitals, the babies are not bathed; in others, various products are used—oil, alcohol, water, soap, pHisoHex. The limited number of hospitals does not permit determination of the effect of each product, and moreover this was not our intention. However, the hospitals can readily be grouped according to whether they do or do not bath the infants.

TABLE IV.—INFLUENCE ON THE RATE OF STAPHYLOCOCCAL INFECTION OF THE BATHING OF INFANTS

	No bathing				*Bathing*			
	Hospital	*No. births*	*No. cases*	*%*	*Hospital*	*No. births*	*No. cases*	*%*
"Isolated infants" "hand washing"	A_{11}	2760	3	0.1	A_8	2000	2	0.1
"Infants + nursing infants" "hand washing"	I_2	782	20	2.56	A_7	1231	0	0.0
					I_3	1148	4	0.35
					I_1	1611	25	1.55
						Mean		0.72
"Infants + nursing infants" "no hand washing"	E_2	1007	47	4.7	A_1	299	9	3.0
					A_6	1175	11	0.9
					G	936	10	1.07
					D	1966	53	2.7
					E_3	800	2	0.25
					A_5	338	15	4.4
						Mean		1.8

From the above results, hospitals where all or only some of the babies are transferred can be grouped together under the heading "infants + nursing infants"; those where the personnel wash their hands with soap or pHisoHex under the heading "hand washing", and those where they do not wash their hands or merely dip them in Dettol under the heading "no hand washing".

In Table IV, we have attempted to determine the effects of "no hand washing" as compared with "bathing of the infants" (pHisoHex, soap and water, oil, alcohol) in the following three categories: (1) "hand washing" of personnel and "isolated infants"; (2) "hand washing" of personnel and "infants + nursing infants"; (3) "no hand washing" of personnel and "infants + nursing infants".

Statistical analysis of the results shows that, in nurseries where the babies are not transferred and where the nurses wash their hands, it may be immaterial whether the infants are bathed or not;

in nurseries where the infants are transferred and the personnel wash their hands, there is a very significant difference (chi-square criterion, level less than 0.1%) in favour of bathing the babies, the incidence of infection being 2.56% in the case of "no bathing" as compared with 0.72% when the infants are bathed. In nurseries where the infants are transferred but the personnel do not scrub, the incidence of infection increases to 4.7% for "no bathing" and to 1.8% for "bathing", with a high degree of significance (chi-square criterion, level less than 0.1%).

DISCUSSION

Our investigation appears to be the first attempt ever made to establish the incidence of staphylococcal infection in a specialized hospital department, the nursery, in a group of institutions spread over a large territory. Such surveys are necessary for the information of epidemiologists and public health services on the situation regarding staphylococcal infection in the community. Also, for the first time, the influence is demonstrated of transferring the infants out of and into the nursery.

Owing to the limited number of hospitals which met our standards, we were unable to determine statistically which of the three factors of the technique studied has the greatest individual importance in the nursing method. Estimation of the relative value of each of these factors would require breaking down the statistical analysis for each of the three methods of handling the babies in the nurseries, for each of the three preparations used for scrubbing, and for each of the three preparations used for bathing the babies; so that, in all, 27 different combinations would be necessary, and there were only 13 institutions. Analysis of our results is therefore limited to showing the definite and combined influence of the three factors studied on the dissemination of infection.

Among other factors which might have had some influence, the wearing of a mask could be mentioned, but the authors agree that it has little effect.[2-11] Allison and Hobbs,[12] Weymuller[13] and Campbell[8] also mention crowding as a factor of dissemination. As all the nurseries which we visited were filled to capacity, with little space between the beds, as described earlier in this article, it can be taken that, in the present series at least, this factor had very little influence. Ravenholt,[14] while admitting that the recommended 24 to 30 square feet per infant is inadequate, nevertheless believes that staphylococci do not need the help of crowding to spread, owing to their high power of survival outside the human body.[15]

Allison and Hobbs[12] and Plueckhahn[16] are of the opinion that use of a single table for handling the infants promotes contamination. In half our nurseries a single table was used, on which the infant was placed on a sterile towel changed each time; in the remaining half all handling was done in the infant's crib. As the hospitals in which a single table was used did not necessarily show the highest incidence of infection (Table I), it can be concluded that this factor is of little importance. Professional training (nurses, students and nursemaids), number and stability of staff being comparable in the various hospitals, there was no ground for discrimination between the institutions in this respect.

It is evident from all epidemiological studies of staphylococcal infections in nurseries that the hands are a great source of dissemination. For instance, Table III shows that, irrespective of the other points of the technique, the incidence of infection falls from 2.70% to 0.5% in nurseries where the nurses and nursemaids wash their hands after handling each infant. These figures clearly prove the effectiveness of hand washing and support the authors' recommendations.[4-6, 9, 11, 16, 18-22]

As regards the product used, Allers, Hubbell and Buck[23] have presented bacteriological evidence as to the superior value of pHisoHex over soap. Data from Table III are insufficient to throw any light on their point.

One thing is certain, pHisoHex is much milder for the hands, which promotes its regular use. The incidence of infection in the group using Dettol is nearly as high as in the one where the nurses and nursemaids do not wash their hands, 1.9% and 2.70% respectively. These results should not be blamed on the preparation itself, but rather on its improper use. The nurses and helpers merely dip their hands rapidly without rubbing in the solution; it has no time to exert any bactericidal action. Moreover, these solutions are left exposed to the air for several hours or even days, thus losing all antiseptic power.

Bathing of babies is a controversial subject. Parmelee[24] in 1946 was the first to suggest the "dry care" method; the Academy of Pediatrics in its Standards and Recommendations (1954)[25] also advocated dry care. The partisans of not bathing the babies[4, 11, 16, 26, 27] claim reduction in contacts with the staff, who are a source of staphylococci, and avoidance of chafing of the infant's skin whereby infection can gain access.

However, Hardyment,[7] in particular, found 0.33% of infections in a series of 1517 infants washed with pHisoHex as compared with 2.85% in 1506 infants treated by dry technique. Farquharson *et al.*[18] reported a reduction in incidence of infection from 6.54% to 0.63% after the use of pHisoHex. Similar results have been reported by other authors.[5, 19, 28, 29, 40]

Our results show that washing or not washing the infants may be immaterial, provided they do not leave the nursery and provided also that the nurses and nursemaids wash their hands. But if either of these two conditions is lacking, it is far preferable to wash the infants.

It is quite justifiable to think that when the infants are transferred there is a risk of infection through contact with contaminated objects or in-

dividuals; if, at the same time, the nurses and helpers do not wash their hands, the chances of spreading contamination which may have originated from outside sources are increased. Under these conditions, bathing the infants would appear to reduce the risk. Baldwin *et al.*[28] report that, when they used the "dry care" technique in their nursery, they noted an increase in the rate of staphylococcal nasal and skin carriers and also an increase of staphylococci on the cribs and other articles. When routine washing with hexachlorophene was resumed, they noted an immediate decline in the rate of carriers, a check of the staphylococcus transmission from one infant to the other in the absence of adult carriers, and finally a decrease in the number of *Staphylococcus pyogenes* on the cribs and other articles.

SUMMARY AND CONCLUSIONS

We have personally conducted a field investigation in 26 hospitals distributed throughout most of the regions of the province of Quebec to determine the prevalence of staphylococcal infections in the nurseries and the influence on these infections of three important points of infant-nursing technique.

In 13 hospitals which fully met our requirements, out of 16,053 births reported during the year 1956, there were 201 cases of staphylococcal infection which occurred in the nurseries, or an average incidence of 1.25% with a range of 0 to 4.7%, and this was during a period when epidemics had abated.

Layout and maintenance of the premises, space available for each infant, wearing of mask and gown, hierarchy and competence of the staff, method of examination of the infants by the physicians, and prohibition of admission of visitors and physicians in the nurseries were factors that were similar in all the hospitals. The investigation was supplemented by a bacteriological study, the results of which will be published later. As the incidence of staphylococcus carriers was comparable in various nurseries with variable incidence of infection, this factor would not seem to have had much effect on the results reported here.

Our results clearly show that it makes no difference whether the infants are or are not bathed (with soap and water, oil, pHisoHex, alcohol) provided the infants do not leave the nursery and provided the nurses and nursemaids wash their hands (soap, pHisoHex) before handling each infant. Mere dipping of the hands in a Dettol solution is equivalent to not washing them. On the contrary, it is far preferable to bath the infants if they are transferred out of and into the nursery and/or if the personnel do not scrub.

The influence of transferring the infants out of and into the nursery on the incidence of infection, which has been studied for the first time in the present investigation, may serve as a basis for a revision of the techniques followed in the care of infants in hospital nurseries, as well as our other results which confirm reports published during the past few years.

We are very much indebted to members of the personnel of the different hospitals whose interest and co-operation rendered possible the above study, also to our former colleague, Dr. R. Desjardins, from Ste-Justine Hospital in Montreal, who took part in the organization of the survey, and to Dr. A. MacMillan, of Johns Hopkins Hospital, Baltimore, for his kind advice.

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RÉSUMÉ

Nous avons conduit, personnellement et sur place, une enquête dans 26 hôpitaux répartis dans la plupart des régions de la province de Québec, pour connaître la prévalence des infections staphylococciques dans les pouponnières et l'influence de trois points capitaux de la technique du nursing des bébés sur ces infections.

Dans les 13 hôpitaux qui ont pleinement satisfait à nos exigences, sur les 16,053 naissances déclarées pour l'année 1956, nous avons relevé 201 cas d'infection staphylococcique apparus dans les pouponnières, soit un taux moyen de 1.25% avec des extrêmes allant de 0. à 4.7%, ceci en période d'accalmie épidémique.

La disposition des locaux, leur entretien, l'espace réservé à chaque bébé, le port du masque et de la blouse, la hiérarchie et la compétence du personnel, le mode d'examen des bébés par les médecins, l'interdiction de l'entrée dans les pouponnières aux médecins et visiteurs constituaient des facteurs semblables dans tous les hôpitaux. Nous avons complété notre étude par une enquête bactériologique dont les résultats seront publiés plus tard. La fréquence des porteurs de germes, étant comparable dans diverses pouponnières présentant des taux différents d'infection, n'a pas pu, semble-t-il, influencer les résultats ici rapportés.

Nos résultats montrent clairement que de laver (eau et savon, huile, hexachlorophène, alcool) ou de ne pas laver les bébés est indifférent pourvu que les bébés restent dans les pouponnières et que les infirmières et gardes-bébés se lavent les mains (savon, hexachlorophène) entre les soins donnés à chaque bébé. Le simple trempage des mains dans une solution de Dettol (chloroxylénol et terpinéol) équivaut à aucun lavage. Mais au contraire, il est de beaucoup préférable de laver les bébés lorsque les bébés sortent ou que les infirmières et gardes-bébés ne se lavent pas les mains ou lorsque ces deux conditions sont réunies.

L'influence de la sortie des bébés hors des pouponnières sur le taux d'infection, qui a été étudié pour la première fois dans ce travail, peut servir de base à une revision des techniques de soins des bébés dans les pouponnières d'hôpitaux, de même que nos autres résultats qui confirment d'autres travaux publiés ces dernières années.

THE WITHDRAWAL SYNDROME IN ALCOHOLISM*

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THERE IS A GROWING TENDENCY to see in some varieties of the broad category of alcoholism a true physical dependence upon alcohol, entirely analogous to the dependence upon morphine, heroin and the barbiturates in addicts to those drugs. (Acquired tissue tolerance and "craving" are of course related to the development of physical dependence.)

The main criterion for the development of physical dependence upon alcohol, or upon any other drug, is the emergence of certain disturbing symptoms on the abrupt cessation or even the diminished rate of ingestion of the substance in question. These untoward manifestations are known as withdrawal symptoms and form an entire syndrome. Thus it would seem appropriate to review the present status of the question pertaining to the withdrawal syndrome in alcoholism.

According to an Expert Committee of the World Health Organization:[1]

"Withdrawal symptoms may be defined as those manifestations which appear either after cessation of drinking or even after an abrupt decrease in the rate of intake, either of which, in the opinion of the Committee, constitutes a 'withdrawal'. It follows that such symptoms are not present as long as a sufficient degree of intoxication is maintained and that the symptoms can be relieved by alcohol or by some drug with similar pharmacological effects (e.g., paraldehyde, barbiturates, and chloral hydrate)."

That the *decrease* of the level of alcohol (or of an addiction-producing drug) may provoke withdrawal symptoms has been emphasized by many observers (e.g., Page,[2] Pohlisch,[3] Bell,[4] and Isbell *et al.*[5])

In the case of alcohol, some psychiatrically or psychologically oriented students of the problem have either denied the occurrence of withdrawal symptoms or—more frequently—in their discussion of the development of "alcoholism" have omitted any mention of such symptoms. Psychiatrists who deny the existence of withdrawal symptoms do not mean that such behaviour as mentioned above is not observed in acute intoxication, but that it is of "psychological origin". In the psychiatric literature on alcoholism, with few exceptions, the affirmative use of the term "withdrawal symptoms" implies that the author assumes their physical origin.

Psychiatrists who reject the idea that alcoholism is an addiction in the pharmacological sense place great weight on the psychological explanation of the "apparent" withdrawal symptoms. The reason

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for this emphasis is that the admission of true withdrawal symptoms would imply the acceptance of a pharmacological process of addiction in alcoholism. It may be said that the above attitude pertains to those psychiatrists who do not see alcohol addicts in states of acute intoxication, but receive "sobered up" patients with a view to treating their "alcoholic behaviour".

It is of interest to note that some of the proponents of physiopathological etiologies of "alcoholism" have not paid attention to withdrawal symptoms, but have concentrated entirely on organic factors in the explanation of the "uncontrolled use" of alcoholic beverages, without any allusion to possible addictive developments in the pharmacological sense.

Discussion of withdrawal symptoms comes largely from physicians who are frequently called upon to treat patients with acute alcoholic intoxication and from a few experimental studies. From the times of the Hippocratic writings (*Epidemics*, III, 110-116) to the present day the symptoms most consistently observed over the centuries have been tremors and convulsions.

One of the largest series of recent observations was reported by Victor and Adams.[6] Their material consisted of 266 unselected patients admitted consecutively to the Boston City Hospital in various states of acute and chronic alcoholic intoxication. Seventy per cent of these patients were in tremulous hallucinatory, convulsive and delirious states. There were 101 instances of delirium tremens. Tremulousness combined with transient hallucinations occurred in 50% of the patients within 24 hours of cessation of drinking. Seizures occurred within 48 hours after the drinking bouts in 60% of the patients. Psychomotor and autonomic overactivity, tremulousness, hallucinations, and convulsions had the highest incidence three or four days after cessation of the bouts. "It is difficult to escape the conclusion that the clinical states under discussion depend for their production not only upon the effects of prolonged exposure to alcohol, but temporarily on abstinence from the drug."

Godfrey, Kissen and Downs[7] state that "the acute withdrawal state is so stereotyped as to warrant fully the term syndrome"; it suggests "specific physiological disturbances". "First and foremost the patient is frightened, depressed, weak, restless and unable to sleep. . . . Some of these signs and symptoms, along with markedly exaggerated tendon reflexes, sometimes with ankle clonus, nystagmus, and grand mal, epileptiform convulsions, are obviously related to disturbances in the central nervous system of unknown etiology. They are sufficiently clear to the physician and painful to the patient to demand immediate attention. . . . In adequately treated cases there will be frequently an elevation of temperature between 99° and 100° F. during the first 12 hours." In cases treated merely with sedation this may persist much longer.

The statement that the acute withdrawal state is "stereotyped" of course does not imply that all of the withdrawal symptoms will appear in all instances. Pohlisch[3] and many others have pointed out that withdrawal symptoms after an alcoholic bout vary considerably according to the duration of the bout and the quantity of alcohol consumed. This latter point is evident in the data of Isbell *et al.*[5] Polisch[3] also noted that while withdrawal symptoms in the drug addictions are somewhat variable, the variation is greater in alcoholism. But at the same time it must be said that, in spite of all variation, the nature of the withdrawal symptoms is the same in alcoholism as in the drug addictions. For recent descriptions of the more constant and often minor withdrawal symptoms, see Mitchell;[8] Greenfield;[9] Grandon *et al.*;[10] Burroughs;[11] Albert *et al.*;[12] Greenhouse;[13] Izikowitz, Maartens and Dahlbom;[14] Fazekas, Shea and Rea;[15] Page;[2] Cummins and Friend;[16] and Kalinowsky,[17] as well as Bensoussan,[18] who covers the French literature on this subject. Anorexia, insomnia, dysphoria, psychomotor hyperactivity, tremor and nausea are usually present even after milder bouts.

Frequently dehydration is mentioned as a manifestation of the withdrawal syndrome. This is more correctly formulated by Godfrey, Kissen and Downs,[7] who state that the alcohol withdrawal syndrome is "associated with both dehydration and starvation. . . ." "Associated with" is the correct expression because dehydration cannot be regarded as a withdrawal symptom, but does appear after prolonged bouts, largely as a result of near starvation caused by the neglect of food intake during a spree.

Withdrawal of alcohol, however, especially after bouts of long duration and extremely high alcohol intake, may produce severe and dangerous symptoms. "It is not generally realized that patients in this condition [acute intoxication], if not treated effectively . . . may develop severe physical and mental complications" (Nason[19]). He also mentions fatal outcomes. Solms[20] also reports on withdrawal symptoms with fatal termination.

Extreme instances of agitation may present grave dangers; "psychomotor agitation is one of the most distressing symptoms observed in alcoholic patients during the period of recovery from an acute bout of intoxication" (Kissen *et al.*[21]). But the severest forms of withdrawal symptoms are convulsions and in limited instances delirium tremens.

Convulsions following alcohol withdrawal have received either too much or too little attention. The fairly large, often rather obscure, literature on "alcoholic epilepsy" has built a case on the epileptogenic properties of alcohol, and an evaluation has been made difficult through the undoubtedly higher incidence of alcoholism among epileptics than among the general population. There is, however, sufficient evidence that epileptiform convulsions may occur on alcohol withdrawal in persons who had neither epilepsy nor an epileptic family history. As far back as 1848,

Magnus Huss found that "chronic alcoholics" may develop convulsions "which resemble chorea", and he distinguishes clearly between these in drinking epileptic patients and the convulsions brought about by alcohol withdrawal (Jellinek[22]).

Out of his clinical experience, one of the foremost students of alcoholism, Rudolph Wlassak,[23] came to the conclusion that convulsions following alcohol withdrawal should not be equated with epilepsy unless in the particular case the evidence was obvious. In the past 15 or 20 years the literature on the treatment of acute alcohol intoxication and specifically on withdrawal symptoms tends to deal with alcoholic convulsions rather as withdrawal symptoms than as epilepsy provoked by alcohol. It is, however, recognized that alcohol exacerbates epileptic conditions.

It has been suggested that the appearance of convulsions after severe alcoholic bouts may be related to magnesium deficiency. Klingman *et al.*[24] have shown in 10 patients with delirium and confusion, tremors and convulsions that these symptoms could be stopped within a short time by intravenous administration of 10 to 40 grams of magnesium sulfate. These investigators found some indications of this relation experimentally in rats, although the results were not quite clear-cut. Klingman and his associates suggest that seizures involve a derangement in brain cell electrolytes. An electrolyte imbalance could conceivably result from the absence or an insufficient level of alcohol in nerve tissue which had adapted itself to the presence of that drug. The process is not quite clear but this is true of the mechanism of all withdrawal symptoms whether pertaining to alcohol or other drugs.

Electroencephalographic changes too have been seen after alcohol withdrawal: "A characteristic electroencephalographic pattern was obtained during chronic intoxication with alcohol and during the withdrawal period. Early during chronic intoxication, the EEG's were generally slowed whenever the patients had high blood alcohol levels and were showing clinical evidence of intoxication. Later during chronic intoxication, the EEG's were not as slow, even though blood alcohol levels were higher than during the early part of the period of intoxication. Following withdrawal of alcohol, the EEG first became normal. Between the 16th and 33rd hours of abstinence, the percentage of alpha activity declined and random spikes and bursts of slow waves were observed" (Isbell *et al.*;[5] see also Wikler *et al.*[25]).

Whether the EEG changes themselves constitute withdrawal symptoms, or whether they are merely reflections of the various neurological withdrawal symptoms, cannot be said. However, no specific changes could be always related to hallucinosis or delirium tremens.

The question of delirium tremens as a withdrawal symptom has been reopened after the famous experiment conducted by Isbell and his associates.[5] Actually the question was never quite closed. It would appear that the negation of alcohol withdrawal as a cause of delirium tremens is regarded as a rather modern development, and the impression is that in Europe delirium tremens is predominantly thought of as a withdrawal symptom. Already at the end of the nineteenth century, a majority of European authorities had relegated the withdrawal causation of delirium tremens into obsolescence, as can be seen from Rosenfeld's[26] review of the effects of alcohol. Nevertheless, in Europe a sizeable minority of physicians has continued to regard delirium tremens as a withdrawal symptom, although not to the exclusion of other causation.

In the United States the trend towards a negation of any relation between delirium tremens and alcohol withdrawal began well in the nineteen-twenties although such opinions had been voiced sporadically since the turn of the century. It may be said that American authorities broke definitely with the withdrawal theory in the nineteen-thirties when vitamin deficiencies were postulated as etiological factors of delirium tremens, although up to the present day no proof of this has been given. A small minority of American authorities have never given up belief in the withdrawal etiology of delirium tremens and their number has been growing lately (see, for instance, Victor and Adams[6]) until the experiments of Isbell and his associates called for a revision of opinions. Isbell *et al.*[5] decided on an experimental investigation of alcohol withdrawal symptoms in human subjects, to whom alcohol was to be administered over periods well exceeding the duration of ordinary drinking bouts in quantities approaching the theoretical maximum of alcoholic intake. They were led to this by the following considerations.

> "A large proportion of the alcoholics admitted to general hospitals have been intoxicated only a brief time or have been on a debauch of only a few days' duration; they cannot, therefore, be expected to develop serious manifestations of an abstinence syndrome on abrupt withdrawal of alcohol. Furthermore, as was pointed out by Kalinowsky, even though alcohol is withdrawn, these patients are almost invariably given some type of sedative medication, most frequently paraldehyde, and such medication may be equivalent to continuing to give alcohol. On the other hand, total withdrawal of alcohol may not be necessary for the precipitation of abstinence symptoms—that is, a reduction in alcohol intake may be sufficient to precipitate them. This may be analogous to the situation in barbiturate addiction, in which a sudden reduction of dosage may be followed by convulsions or delirium or both."

All the ten subjects were former morphine addicts who were serving sentences for violation of the Harrison Narcotic Act, and who volunteered for the experiment. Four of the subjects had also a history of heavy alcohol drinking and were at least incipient alcoholics previous to their morphinism.

Three of the subjects drank only from 7 to 16 days and averaged daily amounts ranging from 266 c.c. to 293 c.c. of absolute alcohol. The remaining seven subjects drank from 34 to 87 consecutive days. Their daily average amounts ranged from 346 c.c. to 489 c.c. of absolute alcohol.

"It is noteworthy that all the patients exceeded the amount of alcohol that is usually cited as the average (100 mg. per kg. per hr., or 224 ml. of 95% alcohol daily) that can be metabolized by a man weighing 70 kg., and four patients nearly attained the daily consumption (400 g. or 533 ml. daily) regarded as the maximum intake possible."

"Three subjects who drank for only 7 to 16 days sobered up rapidly after they discontinued alcohol. As the degree of intoxication declined, they became slightly tremulous, perspired excessively, complained of gastric distress, nervousness and weakness. They recovered rapidly, and after 1 to 3 days appeared to be completely normal. The overall picture in these three patients was merely that of a severe 'hangover'. One, who complained the most, requested drinks to relieve his symptoms."

"Six of the patients drank for 48 to 87 days. Following abrupt withdrawal of alcohol, all developed tremors, marked weakness, nausea, vomiting, diarrhœa, hyperreflexia, fever and hypertension. Two of these six patients had seizures; three had a frank delirium (one of these three was receiving large amounts of barbiturates at the time delirium occurred); two had transient visual or auditory hallucinations or both; and one escaped both convulsions and hallucinations. These phenomena occurred despite the ingestion of an adequate diet, with multiple vitamin supplements throughout the periods of intoxication and withdrawal."

While the above experimental results have created great interest and re-thinking of the problem among students of alcoholism, words of caution have been expressed on account of the fact that the experimental subjects were all former morphine addicts and that some of them had been at least incipient alcoholics previous to their morphinism (cf Himwich[27]). The present reviewer joins in this caution, but does not believe that the experimental results are invalidated, particularly as two of the three subjects who developed delirium tremens after withdrawal had no alcoholic history.

Isbell and his associates do not maintain that delirium tremens is necessarily caused by withdrawal, but rather that under certain circumstances it can emerge as a withdrawal symptom; their views are given verbatim below:

"Results obtained in this study indicate that withdrawal of alcohol from chronically intoxicated persons is at least one of the factors which will precipitate convulsions or a delirium or both. Of the ten patients three withdrew so soon after the experiment began that severe abstinence symptoms were hardly to be expected. One discontinued after a month, and was probably marginal in this respect. All of the six patients who drank for 48 days or more exhibited significant symptoms on withdrawal. All had tremor, weakness, perspiration, nausea, vomiting, diarrhœa, hyperreflexia, slight fever, elevated blood pressure, and insomnia. Convulsions occurred in two. Hallucinations with insight and clear sensorium were observed in two patients, and frank delirium occurred in two.

"While the data strongly support the thesis that withdrawal of alcohol did precipitate a characteristic train of symptoms, including convulsions and delirium, they do not preclude the possibility that factors other than withdrawal of alcohol may precipitate these phenomena under other conditions. Nor do they exclude the possibility that the symptoms would have occurred, without alcohol being withdrawn, had the patients continued to drink for longer periods of time.

"One might ask why convulsions and frank delirium did not occur in all the patients. This is scarcely to be expected, since individual variation following withdrawal of drugs other than alcohol is rather great. Abrupt withdrawal of barbiturates from chronically intoxicated persons results in convulsions in only 75 per cent of the cases and delirium in only 60 per cent. The factors responsible for this variation are unknown but, by analogy, similar variation would be expected after withdrawal of alcohol. Actually, the variations following withdrawal of alcohol may be greater than with barbiturates . . . Most of the clinical syndromes attributed by Victor and Adams to withdrawal of alcohol were represented in the present experiment.

"From the data, it appears that severe withdrawal symptoms may occur after consumption of 400 to 500 ml. of 95% alcohol (equivalent to 770 to 950 ml. of 100-proof whisky) for 48 days or more. Much more information on the relationship of the amount of alcohol consumed and the length of the debauch to the severity of the symptoms of abstinence is needed."

The indications are that, under such extreme conditions as described above, delirium tremens may arise as a consequence of alcohol withdrawal. Apparently this severe form of abstinence symptoms does not occur at decreasing alcohol levels, but rather after total disappearance of alcohol in the body tissues, from two to three days after termination of the drinking bout. On the other hand, the material of Isbell and his associates does not point to alcohol withdrawal as the sole etiological factor of delirium tremens.

In the refutation of delirium tremens as a possible withdrawal phenomenon, an argument presented by Bowman, Wortis and Keiser[28] played a prominent role: "In the prodromal period of delirium tremens, the patient often experiences a disgust of alcohol sufficient to cause abstinence for several days. The acute gastritis and hepatitis which so many patients have, often makes it impossible for them to retain anything by mouth, including alcohol. It is this type of abstinence which has often been mistaken as a cause rather than a result of delirium tremens."

The above passage was presented by Bowman and Jellinek[29] as a potent argument, but now it would seem to the present reviewer that the inability to ingest any more alcohol on account of gastritis, etc., constitutes a condition of withdrawal although it is not of external origin. Likewise, hospitalization for infectious disease which so of-

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ten precedes delirium tremens brings about withdrawal, but in this instance lowered resistance due to disease processes presumably also plays a prominent role.

The alcohol withdrawal syndrome is so well documented that its existence can hardly be denied and under certain conditions (such as bouts of several weeks with maximum daily intake) it may culminate in delirium tremens.

There is little doubt that phenomena on the symbolic level enter into the withdrawal syndrome and reinforce some of the symptoms which, however, basically are of a true neurological character, some of them of a neuro-endocrine nature.

Some "late withdrawal symptoms" have been suggested which according to Wellman[30] are most severe during the first six months of abstinence, but may occur even after five to ten years. Irritability, depression, fatigue and "sense of aloneness" are mentioned, but these conditions, of which members of Alcoholics Anonymous sometimes complain, seem to be rather indications of insufficient adaptation on the symbolic level to an alcohol-free life.

SUMMARY

The question whether or not some varieties of alcoholism are addictions in the strict pharmacological sense can be answered only in terms of acquired tissue tolerance, "craving" and withdrawal symptoms. The latter constitutes the main criterion for the presence of physical dependence.

Many psychiatrists deny the emergence of physical withdrawal symptoms in alcoholism and attempt to explain post-alcoholic upheavals in psychological terms. No doubt, phenomena on the symbolic level do impart a certain colouring to the physical withdrawal manifestations, which have been observed since Hippocrates by physicians who have treated patients in states of severe alcohol intoxication. There is clinical evidence that on abrupt withdrawal and even on suddenly diminished intake of alcohol the same symptoms are manifested as on the withdrawal of morphine, heroin and the barbiturates. Furthermore, the intensity of withdrawal symptoms in alcoholics seems to be related to the duration of the bout and the daily amounts ingested in its course. A fatal outcome ascribable to the withdrawal phenomena has been reported in alcoholics.

The recent experiments of Isbell and his associates at the Public Health Hospital, Lexington, Kentucky, have reopened the question of delirium tremens as a withdrawal symptom. While it cannot be asserted that alcohol withdrawal is the only cause of delirium tremens, it must be considered as one of the causes.

Extreme psychomotor restlessness, tremors, convulsions and hallucinations seem to be the most severe manifestations of alcohol withdrawal. The most marked symptoms emerge on the third or fourth day after the cessation of a bout. In milder cases, only the gastric withdrawal symptoms and slight tremors are seen.

There is some indication that convulsions in the post-alcoholic state may be related to an electrolyte imbalance. Electroencephalographic changes, too, have been seen after alcohol withdrawal.

The sum total of clinical observations makes a purely psychological explanation seem insufficient. The alcohol withdrawal syndrome may be regarded as well established, and thus where the symptoms appear, physical dependence upon alcohol may be assumed in the strictest pharmacological sense.

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RÉSUMÉ

La question de savoir si certaines formes d'alcoolisme sont des toxicomanies au sens purement pharmacologique du mot ne peut recevoir de réponse qu'en terme d'assuétude acquise avec le temps, de désir obsédant et de symptômes de sevrage. Ces facteurs constituent les principaux critères de l'état d'asservissement physique.

Plusieurs psychiatres refusent d'admettre l'origine physique des symptômes de sevrage et essaient d'expliquer le bouleversement post-alcoolique par des raisons psychologiques. L'aspect symbolique des phénomènes peut sans doute teinter les manifestations physiques de sevrage qui ont été observées depuis Hippocrate par ceux qui ont eu à traiter des malades en état d'intoxication alcoolique grave. Il existe des preuves cliniques que la suppression brusque de l'alcool ou même simplement la réduction subite de l'ingestion peut déclencher les mêmes symptômes que l'abstinence de morphine, d'héroïne ou de barbituriques. De plus, l'intensité des symptômes chez les alcooliques semble dépendre de la durée de la soûlerie et de la quantité absorbée chaque jour. Les phénomènes de sevrage peuvent mener à la mort, comme il a déjà été rapporté.

Les expériences récentes d'Isbell et ses collaborateurs, à l'Hôpital d'hygiène publique de Lexington au Kentucky, ont rouvert la question du delirium tremens comme symptôme de sevrage. Bien qu'on ne puisse affirmer que l'abstinence d'alcool soit la seule cause du delirium tremens, elle doit cependant être considérée comme une des causes.

L'agitation psychomotrice extrême, le tremblement, les convulsions et les hallucinations semblent être les manifestations les plus graves de l'abstinence d'alcool. Les symptômes les plus intenses apparaissent le troisième ou le quatrième jour après la fin de l'enivrement. Dans les cas

plus légers, on n'observe que des manifestations gastriques et un peu de trémulation.

Les convulsions de l'état post-alcoolique peuvent dépendre d'un déséquilibre électrolytique. La période d'abstinence comporte aussi des altérations de l'électro-encéphalogramme.

L'ensemble des observations cliniques rend l'explication purement psychologique assez inadéquate. Le syndrome de sevrage peut être considéré comme bien fondé et avec l'apparence des symptômes, on peut présumer une dépendance physique à l'alcool dans toute l'acceptation du sens pharmacologique.

RUPTURE OF THE INTERVENTRICULAR SEPTUM COMPLICATING MYOCARDIAL INFARCTION*

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RUPTURE of the interventricular septum is one of the rare and more serious complications following acute myocardial infarction. Edmondson and Hoxie's report[1] would indicate that only 1-2% of deaths following myocardial infarction are due to rupture of the interventricular septum, while the overall total incidence of cardiac rupture is 8%. This complication usually occurs within the first two weeks of the acute episode and rarely occurs in cases of healed myocardial infarction.[1, 2] In 1956, Sanders[3] reviewed the literature and reported eight additional cases, bringing the total number of reported cases of septal rupture to 132. The diagnosis of this complication is usually not difficult, and awareness of this contingency is the major prerequisite. However, as recently as 1953, Bond[4] reported that the antemortem diagnosis was made in only one-quarter of the reported cases.

This paper presents two additional cases that were seen within a period of six months. The antemortem diagnosis was established in both cases, though one of them presented a very unusual course. A general review of the subject will also be given.

CASE REPORTS

CASE 1.—This 62-year-old man was admitted to the hospital on July 3, 1958, because of severe constricting pain that began about two hours before admission. The pain radiated down both arms to his finger tips and he perspired profusely. It was made worse on deep inspiration. About two months before admission, he experienced substernal pain on exertion, which disappeared at rest. This angina continued and culminated in his present acute attack. The rest of his functional enquiry was essentially normal. On examination, he complained of great pain in his chest and was perspiring profusely. Breathing also appeared to increase the pain. The pertinent findings on examination were as follows: a few basal rales were heard over the left lower chest posteriorly, the blood pressure was 130 mm. Hg systolic and 90 mm. diastolic and the apical rate was 100 per min. A faint functional systolic murmur was heard at the apex; there was no gallop rhythm and no pericardial rub. The immediate electrocardiogram showed a right bundle branch block, with an anteroseptal infarction pattern (Fig. 1). The laboratory data showed a white blood cell count of 20,000 per c.mm., a sedimentation rate of 15 mm. per hour and a serum glutamic oxaloacetic transaminase level of 295 units. He was placed on anticoagulants and complete bed rest.

His course over the next week was relatively benign. He occasionally complained of left-sided chest pain on inspiration, though no pleural or pericardial rub was ever heard. His blood pressure and heart rate were always well maintained. On the morning of July 14 he appeared cheerful and had no complaints. To our great surprise, therefore, a very loud harsh grade V systolic murmur was now heard all over the precordium, with its maximal intensity at the lower left parasternal area. The second heart sound was not heard in this region and a definite thrill could be felt. The rest of the examination was unchanged. His blood pressure was 140 mm. Hg systolic and 90 mm. diastolic and the apical rate was 85 per min. In spite of the absence of a deteriorating clinical picture the clinical impression was that he had ruptured his interventricular septum. The anticoagulants were discontinued and he was carefully watched. A repeat electrocardiogram on July 15 was essentially unchanged. Over the next three weeks, his clinical condition was excellent and his course was that of an uncomplicated infarction. The basal rales that were heard on admission still persisted and he was placed on digitalis on July 28. His blood pressure and heart rate were always well maintained. An electrocardiogram on July 30 was similar to the previous records. He did well and was discharged on August 12, 43 days after his admission and 36 days after this murmur was first detected. On discharge the murmur as described above was still present and unchanged. His course at home was uneventful for the first seven days, but then his breathing became laboured and his condition deteriorated rapidly. He was readmitted to hospital on August 23 in a moribund state with congestive heart failure and in peripheral circulatory collapse. He was cyanotic and dyspnœic and had marked jugular distension. There were rales bilaterally in both posterior lung fields, the blood pressure and pulse were unobtainable, the systolic murmur as heard above was still present, and the liver was enlarged and tender. In spite of the usual anti-shock measures, he died within several hours. The final clinical impression was right-sided congestive heart failure due to a ruptured interventricular septum following myocardial infarction.

At postmortem examination the heart weighed 570 g. and the pericardial sac was adherent over the anterior

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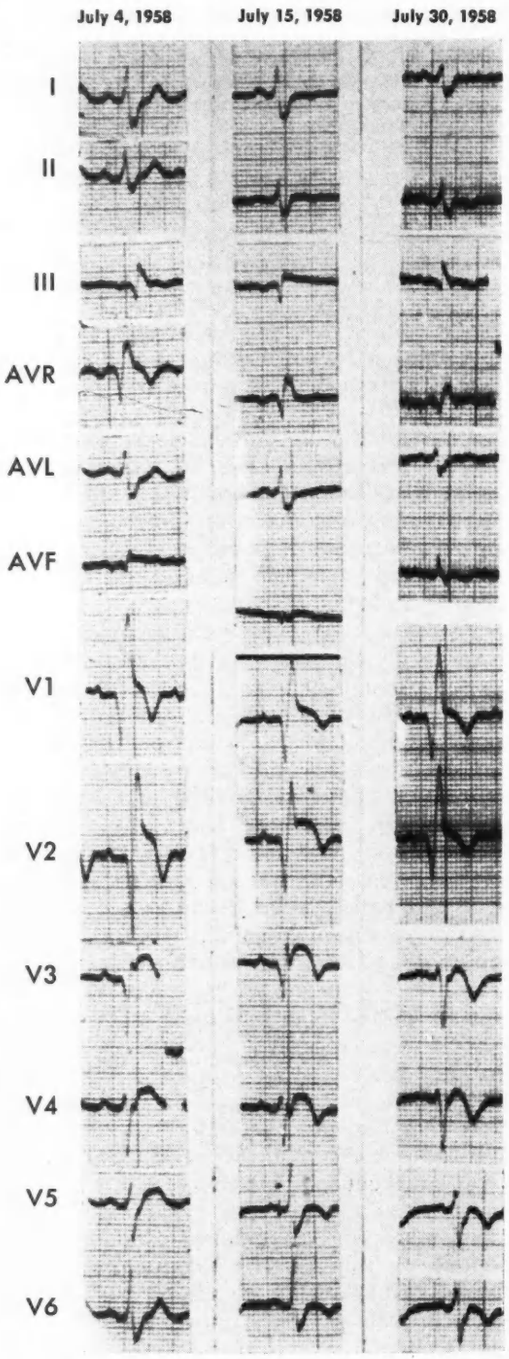

Fig. 1.—Case 1. Electrocardiogram.

surface. When the pericardial sac was dissected away from the anterior surface of the heart, it was seen that the main adhesion had occurred over a small necrotic area on the anterior surface of the left ventricle close to the septum. The central part of this necrotic area appeared yellow and measured 2.5 x 1.5 cm. There was also a small area adherent to the pericardium over the apex of the left ventricle, but the underlying muscle did not appear to be necrotic on gross examination. Serial sections were made through the coronary arteries, all of which showed a moderate degree of calcification of the walls. An organizing thrombus was found occluding the anterior descending branch of the left coronary artery corresponding with the previously described area of necrosis. On opening the heart and viewing the necrotic area from inside, it was seen to involve the anterior portion of the left ventricle and to extend into the septum. It measured 7 x 7 cm. and extended from 2 cm. below the aortic valve to the apex, at which point laminated thrombus formation had taken place over the thinned apex. The remainder of the necrotic area was extremely thin, and it could be appreciated that in the functioning heart it would have formed a large aneurysmal sac. From the upper end of this necrotic area a probe could be passed through a hole 1 cm. in diameter into the right ventricle (Fig. 2). Elsewhere there was uniform dilatation and hypertrophy of all the chambers of the heart which were free from thrombi and lined by thin and glistening endocardium. The foramen ovale was closed. All valve cusps were thin, pliable and translucent. The myocardium of the healthy areas of the left ventricle measured 1.3 cm. and that of the right 0.5 cm. On microscopic examination the left ventricular wall showed an increase of interstitial connective tissue, scattered inflammatory cells and a fibrinous organizing pericardial exudate. The margin of the perforation showed œdema and necrosis of muscle fibres which merged into a thick layer of organizing fibrin on the pericardial surface. Trabeculæ seen in cross-section were completely necrotic and surrounded by a layer of fibrin. The overall picture was consistent with an infarction of varying duration.

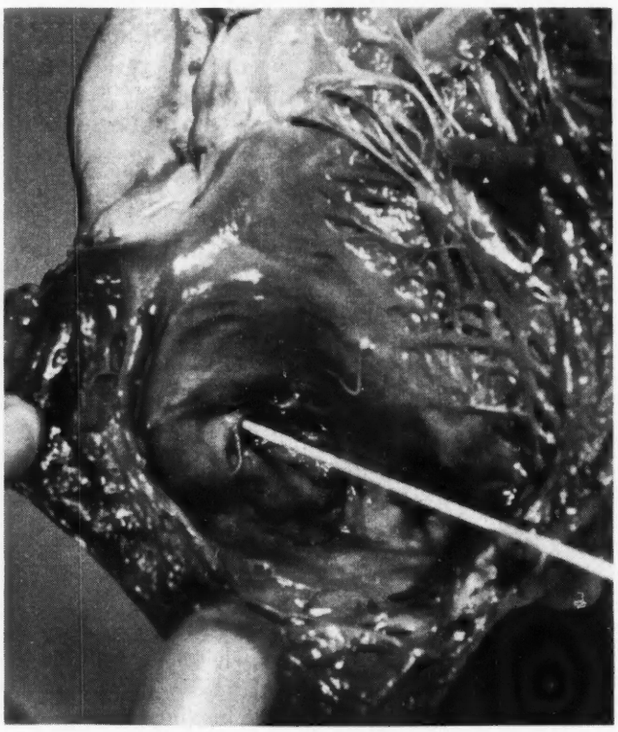

Fig. 2.—Case 1. Left ventricular surface of septum.

CASE 2—This 74-year-old man was admitted to hospital on November 21, 1958, complaining of severe chest pain radiating down his left arm. He stated that he had suffered a heart attack about five years ago and a routine electrocardiogram done in August 1958 confirmed an old antero-septal infarction (Fig. 2). He was apparently doing quite well until about two months before admission, when he began to have pain in his left mid-chest radiating down his left arm. This would come on only on walking and on exertion. Two days before admission he developed a severe sub-

sternal pain that radiated down his left arm. It lasted over one hour and he perspired profusely. Over the next two days he suffered three such episodes and he was finally admitted to hospital. On examination he was in no apparent distress; the jugular veins were not distended, the chest was clear to percussion and auscultation; there were no murmurs, no gallop rhythm, and no pleural or pericardial rub. The blood pressure was 150 mm. Hg systolic and 100 mm. diastolic. The rest of the examination was essentially normal. The admission electrocardiogram showed a posterior wall lesion. The previous antero-septal changes had largely disappeared and were replaced by ST depression from V1 to V6 (Fig. 3). The laboratory data showed a white blood cell count of 17,500, a sedimentation rate of 28 mm. per hour and a serum glutamic oxaloacetic transaminase of 125 units. He was placed on strict bed rest and given anticoagulants. His course was uneventful until 7 p.m. on November 27, when he suddenly developed severe chest pain and profuse sweating. On examination he was cyanotic and his hands were cold and clammy. His jugular veins were distended bilaterally. Both lung fields were filled with moist rales. A grade IV harsh systolic murmur was now heard at the lower left parasternal area, radiating all over the precordium with diminishing intensity. No thrill was felt. His blood pressure was 90 mm. Hg systolic and 78 mm. diastolic and his apical rate 100 per minute. The liver was not thought to be enlarged. His condition rapidly deteriorated and in spite of the usual antishock measures he died five hours later. The final clinical impression was that he had ruptured his intraventricular septum following myocardial infarction.

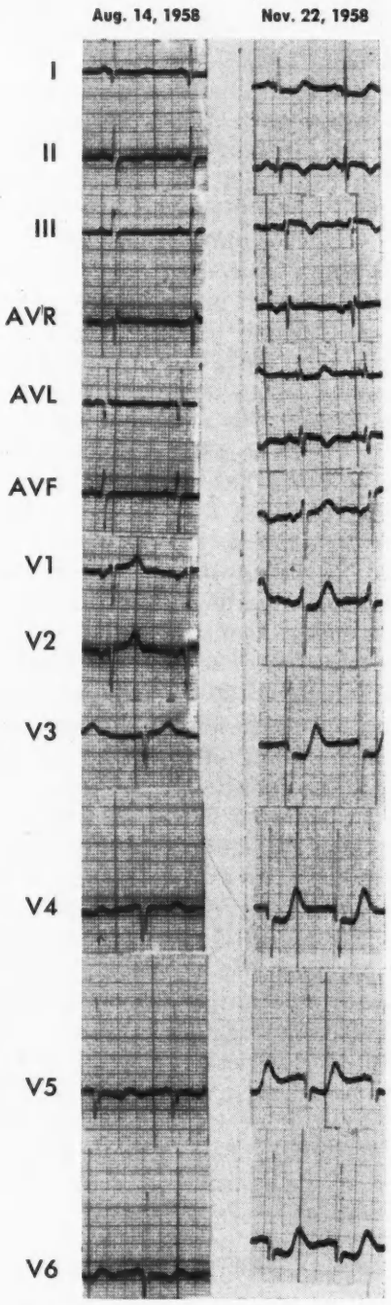

Fig. 3—Case 2. Electrocardiogram.

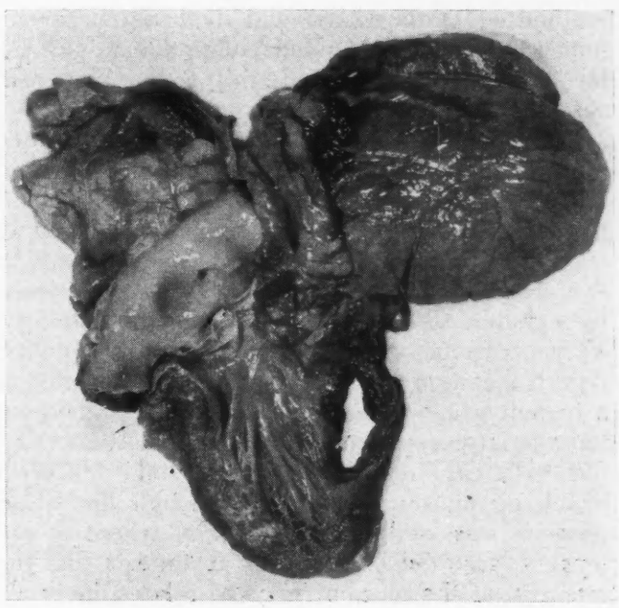

Fig. 4.—Case 2. Left ventricular surface of septum.

At postmortem examination the heart weighed 475 g. and was enlarged on external examination. All chambers and appendages, especially on the left side, were dilated and lined by smooth endocardium. The coronary arteries were thickened by raised, yellowish, atheromatous plaques. The right coronary artery was occluded by a recent thrombus and the anterior descending artery was occluded by what appeared to be an old organized thrombus. There was an old infarction in the anterior wall and a recent one in the posterior wall of the myocardium. This recent infarct extended to the upper posterior septum, and a recent perforation measuring 3 cm. was seen in its interventricular part near the posterior wall (Fig. 4). The left ventricle measured 0.9 cm. in thickness and the right 0.5 cm.

DISCUSSION

The diagnosis of a ruptured septum following infarction is usually dramatic though relatively simple. The sudden appearance of a loud precordial systolic murmur in a person who has suffered a recent infarction should immediately make the clinician suspect this complication.

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Almost invariably, the clinical picture is heralded by a precipitous decline in the patient's condition. One moment his course is uneventful and the next he is in serious difficulty, usually in peripheral circulatory collapse and predominantly right-sided congestive heart failure.

Though Case 2 illustrates this typical course, it is interesting to note that Case 1 had a very unusual onset and course. The characteristic murmur of septal rupture was heard at a routine daily visit though there was no change in the patient's excellent clinical status to suggest this complication. He continued to do well and his immediate course was so like that of an uncomplicated infarction that he was discharged from hospital 36 days after this murmur was first detected. He was, however, readmitted 11 days later and died within several hours in severe right-sided congestive failure. As far as can be determined, this is the first such case to be reported.

The murmur heard is a low-pitched loud systolic murmur resembling very closely that of a congenital interventricular septal defect. It is best heard in the lower left parasternal area and radiates all over the precordium with diminishing intensity.[3-5] It is frequently though not invariably accompanied by a systolic thrill in the area of maximal intensity. Very occasionally, no murmur is heard. Fowler[6] reports a case in which no murmur was detected in a patient who was in shock and coma, and at autopsy a large septal defect was found. Weber[7] refers to a case reported by Bickel and Mozer in which no murmur was heard, though the blood pressure was well maintained, and where at autopsy a large defect was seen. It appears that the intensity of the murmur may be related inversely to the size of the rupture. In cases where the rupture is large the mechanical factors necessary for the production of the murmur may be absent.[4, 8] A diastolic murmur has occasionally been reported[4, 9, 10] but no consistent or satisfactory explanation has been offered. A large perforation, a ventricular aneurysm and an enlarged dilated heart have all been suggested.

The average age of patients with septal rupture is stated by Bond[4] to be 61 years, the youngest being 35.

Most authors agree that a large infarcted area with massive necrosis is the major predisposing factor to perforation of the septum and of the heart in general. It is also believed that hypertension plays a part in the pathogenesis of cardiac rupture generally.[1, 3, 11-14] The existence of hypertension before myocardial infarction is, however, often difficult to ascertain in view of the frequently associated drop in blood pressure.

The electrocardiographic changes after septal rupture are not diagnostic. No characteristic or consistent changes and often no changes at all are noted.[3, 5] The observation that 75% of septal perforations are associated with anterior infarction is sometimes of help in the differential diagnosis.[3]

The prognosis of septal rupture is uniformly grave. Sanders,[3] in a review of 91 cases, found that 54% die within the first week, while 13% survive the second month and 4.5% beyond the first year. Prolonged survival to almost five years has also been reported in isolated cases.[15, 16] In those cases that survive, progressive and severe congestive heart failure, predominantly right-sided, is almost invariably the rule.

Septal perforation may occur at any point along the septum though it usually occurs in the muscular antero-apical portion.[1, 3] The lesion may be single or multiple and may be up to 4 or 5 cm. in size. In both cases presented here the perforation was in the upper portion of the septum and not in the usual antero-apical location. Case 1 was unusual pathologically in that the perforation had occurred at the apex of an aneurysmal formation. Arons[17] has reported a similar case of septal rupture occurring in an aneurysm of the septum in which he imputed to a Bernheim's syndrome the severity of the right-sided congestive failure. It is important to warn the pathologist of the possibility of a septal rupture, for this apparently can be missed at postmortem examination.[3, 4] The coarse septal trabeculations and postmortem clots often shield the small perforations and make the task of location very difficult. This may explain why the clinical impression of a ruptured septum is sometimes not confirmed at the autopsy table.

Ruptured interventricular septum must be differentiated from several other possibilities. The major conditions to be considered are: rupture of a papillary muscle, ruptured mitral chordæ tendineæ, the development of a functional mitral insufficiency and a pericardial friction rub.

The most difficult differential diagnostic problem is to distinguish a septal perforation from a ruptured papillary muscle. Both conditions are associated with myocardial infarction, though a ruptured papillary muscle is a rarer complication. Askey[18] in his classical review of rupture of the papillary muscle suggests several helpful features. He points out that, though the quality of both murmurs is similar, their location is usually different; whereas the murmur of septal perforation is heard best at the left lower sternal border, the murmur of a ruptured papillary muscle is best received at the apex. Moreover, though a murmur is heard in about 96% of patients with ruptured interventricular septum, it is detected in less than half of the patients with ruptured papillary muscle. Though a thrill is present in over half the septal perforations, it has never been recorded in a case of ruptured papillary muscle. There is a greater incidence of diastolic murmurs associated with rupture of a papillary muscle. Left-sided heart failure is the usual development in a ruptured papillary muscle, while in septal rupture the predominant picture is of right-sided failure. The prognosis, though grave in both conditions, is usually poorer with a ruptured papillary muscle.

Sanders[3] also points out that whereas septal perforation is most often associated with anterior infarction, perforation of a ruptured papillary muscle is more frequently associated with posterior infarction.

Rupture of a mitral chorda tendinea is usually found in association with subacute bacterial endocarditis, rheumatic valvulitis or valvular fibrosis of unknown origin.[19] These patients, in the course of their illness, suddenly develop a loud harsh systolic murmur located at the apex or left lower sternal border. There is often an associated thrill and frequently a diastolic murmur is also heard. The development of this murmur is very often insidious and it is discovered at a routine examination, differing therefore from both septal and papillary muscle rupture. The ensuing course, which may not develop for months or years, is that of congestive, predominantly left-sided, cardiac failure.

Relative mitral insufficiency sometimes occurs with cardiac dilatation and failure of the left ventricle. This complication may also produce a loud systolic murmur. Bean[20] reports that 38% of patients with acute myocardial infarction develop this murmur. It is best heard at the apex and radiates to the axilla; it is softer than that of a ruptured septum and an associated thrill is frequently present.

A pericardial friction rub is often found in association with myocardial infarction and according to Bean[20] occurs in 14% of all cases. Its peculiar quality and its frequent occurrence during both systole and diastole, as well as its transitory nature, serve to delineate this complication.

Until recently the treatment of septal rupture was completely symptomatic and supportive. The rapid advances in cardiac surgery, particularly the development of the mechanical heart-lung apparatus may, however, offer hope to some of these patients. Indeed, two surgical attempts at closure of a septal rupture have recently been reported. Cooley,[21] utilizing a temporary cardiac by-pass, operated on a 49-year-old patient who died 45 days postoperatively. Shickman[22] attempted a surgical repair on a 61-year-old man, and though he appeared to tolerate the procedure well and improve, he nevertheless died suddenly on the seventh day.

It is self-evident that the infarcted septum does not provide a favourable surgical approach. Moreover, the underlying coronary disease increases the immediate risk. Possibly newer advances in cardiac surgery may circumvent some of the present difficulties and increase the chances of successful surgical repair.

SUMMARY

Two cases of rupture of the interventricular septum are presented, together with a general review of the subject.

It is emphasized that awareness of this complication is the major prerequisite in the diagnosis of this condition. The development of a loud systolic murmur in a person who has suffered a myocardial infarction should arouse suspicion.

Though the prognosis is grave and the condition almost invariably fatal, it appears that newer techniques in cardiac surgery may increase the possibility of surgical correction in some of these cases.

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RÉSUMÉ

L'auteur rapporte deux cas de rupture de la cloison interventriculaire. Il présente aussi un rappel du sujet dans ses grandes lignés. Le diagnostic de cette complication n'offre pas de difficultés manifestes à condition de conserver à l'esprit la possibilité de son occurrence. L'apparation d'un souffle systolique intense chez un malade qui a un infarctus du myocarde doit éveiller les soupçons. Bien que le pronostic soit des plus sombres et que cette lésion soit presque toujours fatale, il n'est pas impossible que les nouvelles techniques de chirurgie cardiaque puissent un jour offrir quelque espoir.

ENDOMETRIOSIS INVOLVING THE PLEURA

In a case of endometriosis involving the pleura, reported by Ripstein, Rohman and Wallach (*J. Thoracic Surg.*, 37: 464, 1959), the patient had recurrent hæmorrhagic pleural effusion and increased menses associated with moderate abdominal pain, and was unable to conceive. The diagnosis was considered clinically and confirmed by histological examination of tissue from the pleural and peritoneal cavities. Diagnostic pneumoperitoneum was followed promptly by pneumothorax, indicating the presence of a communication between the right pleural and peritoneal space, and permitted the application of the implantation theory as the explanation of this unusual site of endometriosis. Two documented cases of pleural endometriosis and one of endometriosis of the lung are also cited.

This pathological process should be considered in a young woman with recurrent hæmorrhagic pleural effusion of obscure etiology. Early treatment, directed at suppression of ovarian function, will provide relief of the debilitating symptoms secondary to the continuing accumulation of the irritating bloody fluid in the pleural space.

LEVOMEPROMAZINE (NOZINAN)— A NEW NEUROLEPTIC AGENT FOR TREATMENT OF SENILE PATIENTS

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THE INTRODUCTION of neuroleptic drugs has brought about a tremendous change in the therapy and prognosis of psychoses and has opened up several new possibilities in the treatment of various mental and neurological disorders. Though extensive laboratory and clinical investigations have already been carried out and promising results have been obtained, the exact indications for these drugs have not yet been clearly defined.

Levomepromazine, a new potent neuroleptic agent, has been under laboratory investigation and clinical trial for the last three years in France, and more recently in Canada. It is now commercially available under the trade name Nozinan. Its pharmacological action is most closely related to that of chlorpromazine (Largactil) but whereas the central action of the latter is homogeneous and polyvalent, in Nozinan it is dissociated.[3]

Most investigators of this new drug[3, 6, 9, 10] agree that it is a more powerful sedative than chlorpromazine. Courvoisier *et al.* found its sedative action to be 2-4 times as great. According to LaRue and Gosselin, its psychomotor depressive activity is 75% greater than that of chlorpromazine. The antishock and anticonvulsive activity seems equal to that of chlorpromazine.[3, 10] In both laboratory experiments and clinical trials, levomepromazine was found to be one of the most potent antihistamines.[3, 6, 7, 10] The new neuroleptic can be used successfully in combination with chlorpromazine, the meprobamate group of drugs, reserpine, etc.[4, 7, 10] It potentiates the action of tranquillizers[2] and of narcotics.[10]

In clinical trials it has been used extensively in various conditions. It undoubtedly is one of the most potent drugs against insomnia. Its beneficial action on depression is well established and has been emphasized by most investigators.[5-8, 10, 11] Equally good or even better results have been reported in all types of depression: delirious, anxious, stuporous,[4, 5, 7] but one of its outstanding indications appears to be anxiety states, which it controls at all levels[3-7, 9] by reducing their neurosomatic and neurovegetative manifestations.[3] Variable results have been reported in the different types of schizophrenia but it is generally felt that in this condition it is equal to chlorpromazine, while in insomnia, depression, and anxiety it is superior. But failures have been recorded in attempts to control certain neurotic depressions. The results were generally much less favourable in the treatment of mania,[4, 5, 7] and Sigwald *et al.*[10] are the only ones to have obtained satisfactory improvement. In such conditions as mental backwardness, mental confusion and schizophrenia, a symptomatic improvement was noted in sociability, co-operativeness, adaptation and activity.[5, 9]

Some relief has been obtained from levomepromazine in the treatment of various extrapyramidal lesions. The drug has a suppressive action on the extrapyramidal tract,[7, 8] and can control depression associated with parkinsonism. As regards extrapyramidal symptoms, it has the most favourable effect on hypertonia, moderates tremor, and has practically no effect on akinesia. It has never been known to increase extrapyramidal symptoms (tremor, etc.) as chlorpromazine and other similar drugs may do.

Side effects are not common, though moderate transient somnolence during the first few days of administration is not infrequent. In some cases more severe and persistent somnolence occurred, and this must be considered the most frequent untoward effect of levomepromazine.[6-8, 10] Moderate tachycardia or a drop in blood pressure was noted in only a few patients.[6-8, 10] Compared with chlorpromazine, more somnolence and less tachycardia and hypotonia are to be expected. There are practically no striatal symptoms.[6, 8]

It is generally accepted that the dosage required is one-third lower than that of chlorpromazine[8, 11] and that tolerance on the whole is better. The average daily dosage is generally given as 75 mg.[2, 5, 8, 11] but some authors suggest a lower dosage, such as 50 mg. daily.[4, 6, 10] Requirements are usually higher in psychosis.[4, 5, 11] The suggested maximal daily dosage varies from 100 mg.[2] to 400 mg.,[5] the average maximal daily dosage recommended being 250 mg.

The wide range of individual requirements and tolerance and progressive increase in dosage are usually emphasized. The drug is available as 2, 5 and 50 mg. tablets and in the form of solution.

PRESENT STUDY

In the present study we made a clinical trial of levomepromazine on senile patients with various mental and nervous disorders. This clinical investigation was carried out on inmates of a home for the aged and infirm (Hospice Taché de St-Boniface). The patients all had long-standing illness, and had been living in the Home for many years. Many had previously been treated with other sedatives, tranquillizers or neuroleptics (promazine, chlorpromazine, meprobamate, reserpine). The series treated with levomepromazine comprised 98 patients, 51 women and 47 men. Age groups are shown in Table I.

About 80% were over 70, and more than half were over 80. This age distribution indicates the pattern of our clinical trial, for we were interested in the possibilities of the drug in the treatment of senile patients with chronic mental disorders.

TABLE I.—AGES OF PATIENTS

Age group	*No. of patients*
30 - 39	2
40 - 49	3
50 - 59	5
60 - 69	10
70 - 79	26
80 - 89	48
90 and over	4
Total	98

These 98 patients were divided into groups on a practical clinical basis, either according to the leading presenting symptom (e.g. depression) or the clinical entity (e.g. schizophrenia) (Table II). Evaluation of the effect of the drug was also based on the change in the chief symptom or symptom complex. For example, if the result in a markedly aggressive patient is classed as "excellent", this refers to the improvement in his aggressive behaviour and not to cure of his underlying condition (e.g. senile dementia).

TABLE II.—DIAGNOSES

Condition	*No. of patients*
Agitation	30
Depression	22
Mental retardation	13
Parkinsonism	10
Mental confusion	7
Schizophrenia	7
Paranoia	4
Anxiety state	2
Miscellaneous	3
Total	98

At the beginning of the trial we started the patients on the average dosage given in the literature, namely, 75 mg. daily, but soon found that less was required at these ages, and especially that tolerance is poorer than in patients below 50 years of age. We began by giving 25 mg. 3 times daily but on account of intolerance this was gradually reduced and treatment was usually continued at low dosages. In this series we did not try any combinations with barbiturates, meprobamate or promazine derivatives.

The dosages used are shown in Table III. With few exceptions, all our patients were maintained on dosages of 50 mg. or less daily, the average being 25 mg. This was administered either in a single dose at bedtime or in two equal divided doses morning and evening. The symptoms of a considerable number of patients (22) were controlled with as little as 12.5 mg. at bedtime. There was no correlation between dosage and results obtained. Owing to individual response or the nature of the disease, we often had good results with small dosages or failure with high dosages.

TABLE III.—DOSAGES

Daily dosage	*No. of patients*
12.5 mg.	22
25 mg.	43
50 mg.	21
75 mg.	4
100 mg.	7
150 mg.	1
Total	98

Therapy was continued for two to three months. As judged by the general behaviour of the patients and the response of main symptoms, results were classed as excellent in 10, good in 51, fair in 14, and nil in 14. The drug was discontinued in 9 cases.

Thus, over half our patients showed good improvement and about 10% excellent results. Including the patients in whom results were fair, we achieved a therapeutic response in three-quarters of all the senile patients kept on levomepromazine. Approximately 25% were classed as failures, partly due to intolerance (9 patients) and partly due to lack of therapeutic response (14 patients).

The results for each diagnostic group are given in Table IV.

We obtained very good improvement in the groups of agitated and depressed patients, which is in agreement with previous reports in the literature. There were hardly any failures among the agitated patients and only a few among the depressed. Unfortunately, in the third group where excellent response might have been anticipated, namely, patients with anxiety, we had only two cases and both showed such a marked intolerance of the drug that therapy had to be discontinued.

Improvement was above expectations in mentally retarded patients, in whom an appreciable change in behaviour was noted. They were less difficult to manage and better able to carry on their simple daily activities.

Our senile confused patients were less restless, became more sociable, and were better oriented in space and time and better adapted to reality.

Impressive symptomatic relief was noted in five out of seven chronic schizophrenics. One of them showed so much improvement that her transfer to a non-psychiatric ward is being considered if the improvement is maintained. The four others became less negativistic; they were more responsive to normal contact and showed better coherence and greater activity.

We were favourably impressed with the more flexible behaviour of three out of four paranoics. Hallucinations ceased in one of these patients, who before therapy was under almost continuous hallucinations.

Results were less striking in 10 patients with Parkinson's disease. There was considerable decrease in tremor in two patients and only slight improvement in five, but we observed that the

TABLE IV.—RESULTS

	No.	*Excellent*	*Good*	*Fair*	*No result*	*Discontinued*
Agitation	30	3	19	4	2	2
Depression	22	4	10	2	5	1
Mental retardation	13	1	7	2	2	1
Parkinsonism	10	–	2	5	1	2
Schizophrenia	7	1	4	1	1	–
Mental confusion	7	1	4	–	2	–
Paranoia	4	–	3	–	–	1
Anxiety	2	–	–	–	–	2
Miscellaneous	3	–	2	–	1	–
Total	98	10	51	14	14	9

patients benefited from the treatment by a reduction in nervous tension and tremor. On the basis of these results we feel that a therapeutic trial of levomepromazine in parkinsonism is worth while, particularly in view of the general opinion that the drug does not induce or intensify striatal symptoms. We did not try combinations with other drugs such as muscle relaxants which might produce further improvement.

In 14 cases no change was noted in the symptoms or general behaviour of the patient. This proportion of 15% of failures is close to that reported by the above-mentioned authors. Of these 14, five had previously been definitely improved by other drugs such as promazine or chlorpromazine, and were transferred back to these drugs. This further confirms the variation in individual response to neuroleptics already noted by other authors.

In nine patients out of the total of 98, medication had to be discontinued owing to intolerance. Each of these patients showed severe drowsiness associated with general weakness for several days. One of them slept for 48 hours after a single 25 mg. dose. Five of the nine developed marked diarrhœa after starting levomepromazine therapy.

Several other patients manifested moderate initial somnolence, which was controlled by reduction of the dosage or which disappeared spontaneously after a couple of days, as generally reported by previous authors.

Lambert *et al.*[6] emphasize the importance of caution in patients over 50 years of age and in cases of pre-senility. By far the most frequent side effects are severe somnolence, weariness and pallor.

SUMMARY

On the basis of our clinical trial of levomepromazine (Nozinan) on 98 patients, most of whom were in the upper age groups, we feel that this new neuroleptic can be used successfully for senile patients with various nervous disorders.

The results achieved in different diagnostic groups agree with those reported in younger patients. Because of lower dosage requirements and poorer tolerance, markedly lower doses should be given to patients over 60 years of age.

The general rule of increasing dosage gradually must be followed even more strictly for senile patients, who should be more carefully watched for signs of intolerance, the most frequent of which is extreme somnolence.

We are very grateful to Poulenc Limited, who so generously supplied us with all medication.

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RÉSUMÉ

On a administré de la levomepromazine (Nozinan, *marque déposée*) à 98 malades dont la plupart étaient des gens âgés. D'après les résultats cliniques, il semble que ce nouveau neuroleptique puisse être employé avec profit chez les malades séniles atteints de diverses affections nerveuses. L'effet obtenu dans les différents groupes diagnostiques correspond à celui qu'on a rapporté chez des malades plus jeunes. Vu leurs besoins diminués et leur moindre tolérance, les malades dépassant la soixantaine requièrent une dose beaucoup moins forte. Il faut suivre à la lettre la méthode d'augmentation graduelle des doses chez les malades âgés. Ils doivent être surveillés de près pour découvrir les manifestations d'intolérance dont la plus fréquente est la somnolence extrême.

BACTERÆMIA AFTER CARDIAC CATHETERIZATION

On previous occasions, fever had occasionally been noted after cardiac catheterization. In a case in which one hour after completion of the catheterization a shaking chill and temperature rise developed, *Pseudomonas æruginosa* was cultured from the blood drawn during the operation before the appearance of the chill as well as from the benzalkonium aspirated from the catheter and from the adapter. When it was demonstrated that benzalkonium solution failed to prevent growth of bacteria inside the catheter and in the Tuohy adapter, this method of sterilization was discarded. Since then, the incidence of pyrogenic reactions has decreased but they still continue occasionally to occur, apparently when old catheters rather than new ones are used. After all these catheters were rinsed with a 3% solution of hydrogen peroxide, no pyrogenic reactions were noted in 50 subsequent catheterizations. Observations from the literature support the findings of the authors that quaternary ammonium compounds have limited usefulness as disinfectants.—M. D. Shickman, L. B. Guze and M. L. Pearce: *New England J. Med.*, 260: 1164, 1959.

THE EFFECT OF THIORIDAZINE (MELLARIL)* ON MENTAL SYNDROMES† COMPARISON WITH CHLORPROMAZINE AND PROMAZINE

H. AZIMA, M.D., H. DUROST, M.D. and DOROTHY ARTHURS, R.N., *Montreal*

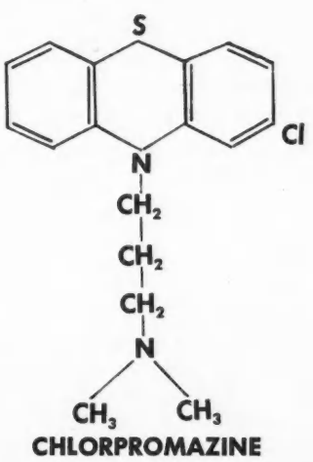
BECAUSE OF the increasing interest in the discovery of substances influencing mental organization, it has become expedient (1) to find substances with greater potency and lesser toxicity; and (2) to eliminate through relatively rapid preliminary trials the drugs with a lower activity than chlorpromazine, which remains the phrenotropic substance of reference. Preliminary trials with thioridazine by Fleeson *et al.*[1] and Cohen[2] seemed to show that this substance possessed an efficacy similar to that of chlorpromazine, but with fewer side effects. The present study was undertaken to assess its gross clinical effects, and to compare it with chlorpromazine and promazine.

Promazine was selected because the authors had previously studied it intensively.[3, 4]

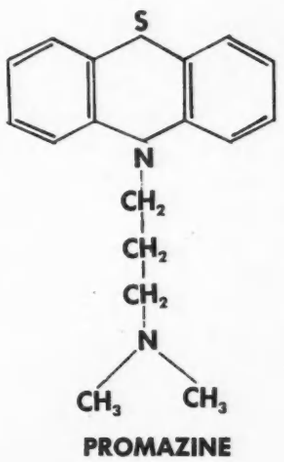
MATERIAL AND METHOD

1. *Pharmacology*

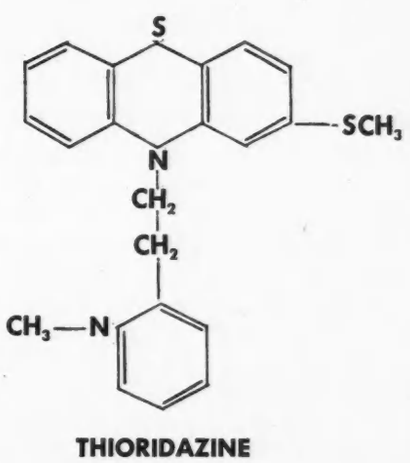
Thioridazine is a phenothiazine derivative with the following formula:



CHLORPROMAZINE



PROMAZINE



THIORIDAZINE

Animal studies indicate that the drug has an anticholinergic and adrenergic blocking action with an insignificant anti-emetic and hypothermic influence.[5] Its effects seem to be comparable to those of chlorpromazine, without the latter drug's side effects, particularly extrapyramidal ones.

2. *Patients*

Thioridazine was administered to 75 patients, 25 women and 50 men, whose average age was 40 years. Diagnostically they consisted of 44 cases of schizophrenia, 6 manic-depressive psychoses (5 manic and one depressed) and 2 organic psychoses, and 23 neurotic states (Table I). Except for 13 schizophrenics, who were chronic patients with an average hospital stay of five years, they were suffering from either acute or recently apparent psychopathological states. They were selected at random as they entered the hospital.

Forty patients of the above 75 were selected for comparison with two other groups of 40 patients, who received chlorpromazine and promazine respectively. An attempt was made to match the groups from the point of view of diagnosis, age, education and sex. Diagnostically in each of the three groups there were 16 schizophrenics (one hebephrenic and 15 paranoids), 13 manic depressives (5 manic and 8 depressive), 2 organic psychotics and 9 neurotics (8 anxiety states and one character neurosis). Symptomatologically all patients were in an acute or subacute category. The average age of the patients was about 40 in all groups, their education was about the high school level, and they were evenly distributed from the point of view of sex.

3. *Drug Administration*

Thioridazine was administered orally in all patients with an average dose of 400 mg. daily (minimum of 150 mg. and maximum of 2000 mg. daily), for an average period of three weeks in the acute cases and three months in chronic cases. The starting dosage was 100 mg. daily. It was increased by approximately 100 mg. every 3-5 days, until the appearance of adequate therapeutic effect. It should be noted that the maintenance dose of the drug for the chronic patients appeared to be about 800 mg. daily. The reason for the cessation of thioridazine after three weeks in acute patients was that in the setting where the drug was used it was impossible to leave the patients in their original states for more than this length of time, particularly when other phrenotropic drugs were

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available for symptomatic relief within less than three weeks.

In the two groups of patients receiving chlorpromazine and promazine for comparative purposes, both of these drugs were administered with the same routine as thioridazine.

4. *Collection of Observations and Method of Appraisal*

As has been argued elsewhere,[6] in preliminary clinical trials of new substances involving a relatively large number of patients in an open psychiatric institute, it is unnecessary to perform double-blind studies. The reason for this is twofold in the present undertaking. (1) If a given drug requires statistical analysis to show that it is effective, it can be inferred that its therapeutic efficacy is quite low, and hence it would be useless for an open institute where the expectancy of psychological recovery is high, the intensity of most of the psychopathologies is not too great, and other potent drugs are already available. (2) The relatively high cost of hospitalization makes it ethically untenable to submit the patients to a period of placebo administration. It is felt that after preliminary trials have shown the high potency of a substance, double-blind studies should be undertaken to determine the details, e.g. of symptoms mostly affected, and of areas of psychic structure involved. However, even in the preliminary trials it is imperative to apply certain precautions in order to ensure a high degree of reliability without the use of a double-blind method, which in itself is not an index of accuracy. To realize this objective, we propose the following methodological variations in pharmacotherapy:

(a) Multiple observers. By this we mean the participation of several observers of different theoretical orientations in the assessment of the effect of a given drug. These observers will use the drug concomitantly in a similar patient population within the same setting and compare their findings. The greater the degree of agreement between the observers, the greater the probability that the effects observed are related to the drug, rather than to the transference phenomena.

(b) Blind drug administration to all patients of a given hospital unit. By this we mean that in a given service or ward all pharmacotherapies, regardless of the nature of the drug, are blind, i.e. the psychiatric and the nursing staff of this given service are unaware of the nature of drugs administered.

In the present study the method of multiple observers was used. The second method is under investigation at the present time in connection with different substances and will be reported later. Eleven psychiatrists and one research nurse (D.A.) participated in the evaluation of the effects of thioridazine. From the point of view of theoretical adherence, six were psychoanalytically and five eclectically oriented. Five were in their third year of residency in psychiatry, and the rest were qualified psychiatrists. They did not know anything about the action of thioridazine, and were simply asked to report their observations. It should be noted that the five qualified psychiatrists had relatively intensive experience with the major phrenotropic substances, and their enthusiasm about trying a new drug was quite low.

As the present study was a preliminary screening trial, the main objective was the assessment of the degree of symptomatic relief and the resumption of social effectiveness. These were assessed according to: (1) the degree of subjective comfort, (2) the degree of behavioural reorganization, (3) ability to go home and (4) ability to return to work. The improvement status was rated marked, moderate, and slight or nil, according to the normalization or the possibility of four, three or two of the above-mentioned items respectively. In the first two items particular attention was paid to symptoms usually affected by the phrenotropic substance, i.e. psychomotor hyperactivity, elation and anxiety.

5. *Laboratory Tests*

The first 50 patients were examined twice weekly for white blood count and differential, urine analysis, alkaline phosphatase and transaminase. Blood pressure and TPR were measured twice daily and the weight was determined once a week.

RESULTS

Table I summarizes the therapeutic efficacy of thioridazine in different mental disorders. These

TABLE I.—THE CLINICAL EFFECTS OF THIORIDAZINE

Diagnosis:	*No. of patients*	*Improvement*		
		Nil or mild	*Moderate*	*Marked*
1. Schizophrenic states				
Simple	6	4	2	
Hebephrenic	1	1		
Paranoid	23	16	7	
Acute	14	7	2	5
	44			
2. Manic depressive states				
Manic	5	1		4
Depressive	1	1		
	6			
3. Organic states				
Senile dementias	1	1		
Alcoholic psychosis	1		1	
	2			
4. Neurotic states				
Depressions	8	2	5	1
Anxiety states	8	1	6	1
Mixed neuroses	5	2	3	
Character neuroses	2	2		
	75	38	26	11

TABLE II.—COMPARISON OF CLINICAL EFFECTS OF PROMAZINE, CHLORPROMAZINE AND THIORIDAZINE

	No. of patients			*Improvement*								
				Nil			*Moderate*			*Marked*		
Diagnosis	*P*	*C*	*T*	*P*	*C*	*T*	*P*	*C*	*T*	*P*	*C*	*T*
Schizophrenic												
Hebephrenic	1	1	1	1	1	1						
Paranoid	15	15	15	5	5	8	5	5	2	5	5	5
Manic depressive												
Manic	5	5	5				1		1	4	5	4
Depressive	8	8	8	5	3	2	3	4	5		1	1
Organic	2	2	2			1	2	2	1			
Neurotic												
Anxiety	8	8	8	3	2	2	5	4	5		2	1
Character disorder	1	1	1	1	1	1						
	40	40	40	15	12	15	16	15	14	9	13	11

P = promazine. C = chlorpromazine. T = thioridazine.

results were derived from the pooling of observations of 11 observers mentioned previously. Of 44 schizophrenic patients, 16 showed significant symptomatic relief (11 moderate and 5 marked improvement). The most favourable results were obtained in acute schizophrenics, about half of whom showed total disappearance of symptoms within about two weeks. Of six manic-depressive patients, one depressed patient showed no response and four manics recovered completely from their manic phase. One patient with senile dementia with agitation did not improve, and one alcoholic psychotic patient recovered sufficiently to be discharged.

In general the effectiveness of thioridazine was in those target symptoms where other phenothiazines have their main influence, i.e. psychomotor activity and excitation states and agitation.

Of 23 neurotics, 16 benefited satisfactorily (14 moderately and two markedly) from the point of view of a decrease in anxiety, tension and agitation.

COMPARISON WITH OTHER PHENOTHIAZINES

The effects of thioridazine were compared with chlorpromazine and promazine in two different conditions: similar syndromes in different patients, and in the same patients longitudinally. In the latter case only chlorpromazine and thioridazine were compared.

1. *In different patients.* Table II gives a summary of the comparison of the clinical effects of chlorpromazine, promazine and thioridazine in 40 patients. As can be seen, the three drugs showed similar effect from the point of view of symptomatic relief. However, the following differences were noted: (a) The average daily dose was lowest with chlorpromazine (200 mg.) and highest with promazine (600 mg.). Thioridazine dosage was closer to that of chlorpromazine (250 mg.). The general impression of different observers was that, dose for dose, chlorpromazine seemed to be slightly more effective. This came out more clearly in the chronic patients receiving both drugs longitudinally (see below). (b) Because of the unavailability of intramuscular thioridazine, manic patients and agitated schizophrenics with marked suspiciousness could be controlled faster and more smoothly with intramuscular chlorpromazine or promazine. (c) Thioridazine and promazine produced less "knocked out" feeling and indifference than chlorpromazine. (d) In the thioridazine group the incidence of serious side effects was nil (see *Side Effects*).

2. *In the same patients.* Table III summarizes the findings in this group. The 27 patients in this category consisted of 22 with schizophrenia (9 acute and 13 chronic), two with agitated depressions, one with agitated senile dementia and two with anxiety neurosis. In 14 patients chlorpromazine was given before thioridazine and in the rest the drugs were reversed in order of administration.

TABLE III.—COMPARISON OF CHLORPROMAZINE AND THIORIDAZINE IN THE SAME PATIENTS

Diagnosis	*No. of patients*	*Improvement*					
		Moderate		*Nil*		*Dosage*	
		C	*T*	*C*	*T*	*C*	*T*
Schizophrenic states							
Acute	9	6	5	3	4	350	400
Chronic	13	7	6	6	7	500	1000
Depression, agitated	2	2	2			250	250
Senile dementia, agitated	1	1	1			200	200
Anxiety neurosis	2	2	1		1	200	200
	27	18	15	9	12		

C = chlorpromazine. T = thioridazine.

Analysis of the data revealed that in both groups the therapeutic response was similar. However, in chronic schizophrenics in order to maintain a satisfactory degree of social effectiveness manifested in ward and home behaviour, it was necessary to use twice as much thioridazine as chlorpromazine. One reason for this may have been the order of administration of the drugs, i.e. chlorpromazine preceding thioridazine. The discontinuation of the former might have produced the appearance of a more disturbed condition requiring heavier doses of a similar substance for return to the previous stabilized state.

SIDE EFFECTS

In the thioridazine group of 75 patients side effects were minimal and consisted of drowsiness in 18, dryness of the mouth in 12, dizziness in 7, generalized weakness in 5, perspiration and hot flushes in 3, difficulty in voiding in 3, and engorgement of breasts in one patient. There were no extrapyramidal signs and no alteration of liver function. Hypertension was minimal. In two patients white blood count decreased, in one to 2300 and in the other to 3200 (from an initial value of 5000) at the end of the first week of treatment. However, the white blood count rose to normal level while the drug was continued.

In the three comparative groups of 40 patients thioridazine was distinguished by the lowest number of side effects (Table IV).

TABLE IV.—COMPARISON OF SIDE EFFECTS

Drug	*Skin reactions*	*Œdema*	*Extrapyramidal symptoms*	*Alkaline phos. rise*	*Collapse*	*Dizziness*
Chlorpromazine	3%	1%	2%	20%	5%	15%
Promazine	2%	1%	1%	3%	0	8%
Thioridazine	0	0	0	0	0	4%

CONCLUSIONS

The above data indicate that thioridazine is a new phenothiazine derivative of considerable efficacy in many psychopathological states. Its effectiveness is observed mainly in those target symptoms which seem to subside under phenothiazine administration, i.e. psychomotor hyperactivity and excitation. The comparison of thioridazine with chlorpromazine and promazine revealed that the drug has an efficacy, dose for dose, similar to that of chlorpromazine in the majority of patients. Its advantages over the latter drug seemed to be the lack of extrapyramidal and liver complications. For this reason, and because of the lack of an intramuscular preparation for use in very hyperactive and difficult patients, the present locale of application of thioridazine seems to be in out-patients and private practice. Considering the two points raised at the beginning of this paper, it can be said that thioridazine is a useful addition to the growing series of active phenotropic drugs, but in itself it does not show any novelty of action or any specificity of application not found in other potent phenothiazines.

SUMMARY

Thioridazine (Mellaril), a new phenothiazine derivative, was administered to 75 patients, consisting of 44 schizophrenics, 6 manic-depressives, 2 organic psychotics and 23 neurotics. The drug was administered with an average daily dose of 400 mg. by mouth, for an average period of three weeks in acute cases and three months in chronic cases.

Three groups of 40 patients were treated separately with thioridazine, chlorpromazine and promazine for the comparison of their effect. In 27 patients the effect of chlorpromazine and thioridazine was compared longitudinally, 14 patients receiving chlorpromazine first and then thioridazine and 13 others in the reverse order.

The study was single-blind and the method of multiple observers was used for the assessment of data. Eleven observers of varied theoretical orientation participated in the final evaluations.

The general impression was that thioridazine is a useful and relatively potent phenothiazine with an activity similar in the majority of instances to chlorpromazine. The main differences seemed to be in the paucity of side effects with thioridazine, particularly the lack of extrapyramidal and liver complications. However, the drug in itself did not show any novelty of action not found in other potent phenothiazines.

Deep gratitude is acknowledged to members of the staff of the Allan Memorial Institute who co-operated in the conduct of this study.

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RÉSUMÉ

Un nouveau dérivé phénothiazinique, la thioridazine (Mellaril, *marque déposée*), fut administré à 75 malades, soit 44 schizophrènes, 6 cyclothymiques, 2 malades atteints de psychose organique et 23 névrosés, à raison de 400 mg. par jour, en moyenne, *per os*. Les cas aigus furent traités pendant une durée moyenne de 3 semaines et les chroniques, de 3 mois.

On traita trois groupes de 40 malades avec de la thioridazine, de la chlorpromazine et de la promazine en vue d'en comparer les effets dans les groupes respectifs. Dans 27 cas les effets de la chlorpromazine et de la thioridazine furent comparés chez les mêmes sujets: 14 malades reçurent d'abord de la chlorpromazine pendant un certain temps et plus tard de la thioridazine; les médicaments furent administrés dans l'ordre inverse chez 13 autres. On eut recours à la méthode des observateurs

multiples dans l'évaluation des résultats cliniques de ce médicament. Onze observateurs d'orientation théorique variée participèrent à cette évaluation.

La thioridazine a créée l'impression d'être une phénothiazine utile et relativement puissante avec une activité semblable dans la majorité des cas à celle de la chlorpromazine. Sa principale différence réside dans le nombre restreint d'incidents du traitement, surtout parmi les complications hépatiques et extrapyramidales. Cependant, ce médicament ne possède aucune action nouvelle qu'on n'a pas déjà observée avec d'autres phénothiazines du même ordre d'activité.

ORAL VERSUS PARENTERAL PENICILLIN

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A recent survey[1] carried out among general practitioners in England revealed that the ratio of cases treated by oral penicillin to those treated by injection was 5 to 2. Of the doctors taking part in this questionnaire (80), 75% stated that oral penicillin was as effective as penicillin by injection. The dosage schedules ranged from 100,000 units 4-8 times daily in children to 200,000 units 4-8 times daily for adults. However, despite this statistical evidence showing the effectiveness and popularity of oral penicillin in general practice, the whole question of the comparative effectiveness of oral versus injectable penicillin is still controversial and requires clarification.

A few hospital studies on the effectiveness of oral penicillin in patients have been reported. In some of these studies[2, 3] blood levels of penicillin were measured. In others[4, 5] clinical assessment and bacteriological tests were carried out. In comparing these methods of evaluation it should be pointed out that blood levels are not necessarily related to therapeutic effects. A critical clinical assessment of each patient supported by appropriate laboratory tests has greater therapeutic significance.

However, very few direct comparisons of injectable and oral penicillin based on clinical and laboratory criteria have been reported. MacLachlan *et al.*[6] carried out a therapeutic trial on 149 cases of pneumococcal pneumonia. They compared oral penicillin (penicillin Ca), 2,400,000 units daily, with intramuscular penicillin, 500,000 units daily, and showed that these two methods of treatment were equally effective. The clinical assessment of these cases was supported by decreased colony counts in both groups in the blood cultures of those patients with bacteræmia.

Wheatley[7] has compared oral and injectable penicillin in a number of acute middle ear infections. He tested oral penicillin—600,000 units three times daily—against parenteral penicillin—600,000 units daily—and showed that oral penicillin was no less effective than penicillin by injection. The infecting organisms were mainly *Staph. aureus* and hæmolytic streptococci, which are sensitive to penicillin therapy.

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Schultz[8] treated a large number of cases of acute gonorrhœal urethritis with a variety of different antibiotics. In his data he compared potassium penicillin G—1,800,000 units per day orally—with procaine penicillin G—600,000 units per day intramuscularly. Clinical response and cultures on the fourth day served as the basis of comparison, and these authors demonstrated that oral penicillin was as effective as parenteral penicillin in the treatment of this disease.

It would therefore seem that oral penicillin, administered at frequent intervals in sufficient amounts (3 to 4 times the intramuscular dose), is effective in diseases caused by penicillin-sensitive organisms. There are two reports on the use of long-lasting penicillin (Falapen) showing that one tablet (500,000 units) given twice daily is effective against gonorrhœal urethritis[2] and upper respiratory infections.[9] However, since no direct comparisons were made with parenteral penicillin, it is the object of this report to present such comparative data.

The trial was carried out on patients with a variety of infectious diseases commonly encountered in general practice. Only patients over six years of age were chosen. Most of the cases were of upper respiratory infections, and they included 7 cases of scarlet fever, 5 cases of severe tonsillitis, 7 cases of moderately severe tonsillitis, 7 cases of otitis media and 13 cases of infections which did not specifically fall into the previously mentioned clinical categories. Sensitivity tests on the infecting organisms were carried out in all patients and, with few exceptions, these organisms were sensitive.

For the most part, alternate patients were treated by parenteral or oral penicillin. However, six of the scarlet fever cases were treated orally, and only one was treated with penicillin by injection.

Before treatment, the clinical status of each patient was evaluated; temperature, pulse rate, and the general state of the patient were noted. The following laboratory tests were carried out: (1) a white blood cell count and differential when the patient was first visited, and repeated 24 hours later; (2) a throat swab taken wherever feasible on the first visit, and repeated 24 hours and 48 hours later. Identification of the organisms was carried out by culture, and the sensitivity of the organisms was tested against penicillin only.

The patients who were treated orally received one tablet containing 500,000 units potassium pen-

TABLE I.—TREATMENT OF SCARLET FEVER WITH PENICILLIN

Case	*Age*		*1st day of treatment*	*2nd day of treatment*	*3rd day of treatment*
A.C.*	8	Throat culture	B. strep. +++	Hæm. staph. +++	
		Neutrophils (abs.)	3510	1560	
		Eosinophils (%)	1	10	
		Temperature	102	98	98
		Pulse	120	100	100
		Clinical assessment	Toxic	Faint rash	No symptoms
J.F.*	11	Throat culture	Negative	B. strep. ++	Negative
		Neutrophils (abs.)	15,750	13,690	
		Eosinophils (%)	0	2	
		Temperature	103	98	
		Pulse	120	90	
		Clinical assessment	Sore throat and rash	Rash almost gone	Completely normal
D.H.*	7	Throat culture	A. strep. +++	Gamma strep. +	Yeast only
		Neutrophils (abs.)	9710		
		Eosinophils (%)	1	6	
		Temperature	100	98	
		Pulse	126	80	
		Clinical assessment	Sore throat and rash	No rash, throat better	Completely normal
B.L.*	12	Throat culture	A. strep. +	No growth	No growth
		Neutrophils (abs.)	10,800	6030	
		Eosinophils (%)	2	5	
		Temperature	100	98	
		Pulse	90	80	
		Clinical assessment	Sore throat and rash	No rash	Completely normal
J.M.*	10	Throat culture	B. strep. ++	Hæm. staph. ++	No growth
		Neutrophils (abs.)	6000	3700	
		Eosinophils (%)	0	1	
		Temperature	101	98.2	
		Pulse	106	90	
		Clinical assessment	Sore throat and rash	No rash, slight tonsillitis	Slight tonsillitis
P.W.*	8	Throat culture	A. strep. +++	Non-hæm. strep. +	Non-hæm. strep. +
		Neutrophils (abs.)	18,500	2280	
		Eosinophils (%)	0	9	
		Temperature	98	98	
		Pulse	120	100	
		Clinical assessment	Rash, cervical glands	Less rash	Normal
M.B.†		Temperature	104	100	
		Pulse	150	110	
		Clinical assessment	Pharyngitis, rash very toxic	Rash fading, throat normal	Normal

*Oral penicillin, one tablet every 12 hours.
†Parenteral penicillin, 600,000 units every 24 hours.

icillin G (Falapen) twice daily. Parenteral therapy consisted of 600,000 units of procaine penicillin G given intramuscularly every 24 hours. Observations and laboratory work on the patients were continued for three days; at the end of this time, the orally treated patients had received a total of 6 tablets of penicillin, and parenterally treated patients 3 intramuscular injections of penicillin. Treatment, however, was continued for an additional two days in all cases.

RESULTS

The results of this study are summarized in Tables I and II. Table I shows six cases of scarlet fever treated with long-acting oral penicillin (500,000 units twice daily) and one case of scarlet fever treated with 600,000 units of procaine penicillin G once daily. Before treatment these patients were febrile with a sore throat, and exhibited the typical scarlet fever rash. All cases were clinically without signs and symptoms of their disease after three treatment days. Throat cultures were positive (with the exception of Case J. F.) for hæmolytic streptococci before treatment, and on the third treatment day there was complete absence of this organism from the cultures of all patients. Comparison of the absolute neutrophil counts on the first and second days showed a decrease in their number on the second day, indicating a decrease in the severity of the infection. The substantial rise in eosinophils in four of the orally treated cases is of interest because a transient eosinophilia is known to occur during the recovery stage of scarlet fever. The laboratory findings parallel and substantiate the clinical recovery of these patients and help to demonstrate the effectiveness of oral penicillin in the treatment of scarlet fever.

Five cases of severe tonsillitis were treated with parenteral penicillin, and four were treated orally. All the patients were toxic, showed slough on their tonsils and were home in bed. At the end of the third treatment day, three of the parenterally treated cases were considered clinically normal, and two were greatly improved or almost normal. Three out of four of the orally treated patients were nor-

TABLE II.—COMPARISON OF ORAL AND PARENTERAL PENICILLIN IN THE TREATMENT OF INFECTIONS

Case	Age	Pre-treatment signs and symptoms	Treatment route	Organisms cultured		W.B.C./mm³. (total)	Differential WC—(%)						Clinical assessment Third day of treatment
				Before treatment	48 hours after treatment		Old	Y	L	Mon.	Eos.	Bas.	
SEVERE TONSILLITIS													
D.A.	20	Dysphagia, slough on both tonsils. T. 102, P. 90	Inject.	A. strep. +++	No growth	1. 16,000 2. 6,500	49 44	30 16	21 33	— 6	— 1	— —	Tonsils almost clear T. 98, P. 80
D.M.	26	Pharyngitis, cervical glands. T. 102, P. 120.	"	B. strep. ++ Haem. staph. ++	Negative	1. 7,100 2. 5,200	32 36	32 7	31 47	5 6	— 3	— 1	Normal. T. 99, P. 80
T.R.	14	Sore throat, cervical glands. T. 102, P. 102.	"	B. strep. +++	Non-haem. strep.	1. 11,300 2. 8,800	62 57	11 12	25 29	2 1	— 1	— —	Improving. T. 99, P. 80
J.Y.	23	Pharyngitis, cervical glands. T. 100, P. 102.	"	B. strep. ++	B. strep. +	1. 8,300 2. 5,400	81 67	6 8	8 17	2 1	2 7	1 1	Normal
H.F.	22	Slough on tonsils. T. 103, P. 126. Infected ulcer on toe.	"	Throat diphtheroid. Toe-haem. staph.	Non-haem. strep. *Haem. staph.	1. 21,200 2. 26,000	78 73	5 11	18 12	— 4	— —	— —	No slough on tonsils; toe ulcer healed. T. 98, P. 90
R.B.	19	Dysphagia, slough on both tonsils. T. 101.6, P. 90.	Oral	A. strep. +++	No growth	1. 18,900 2. 14,700	70 62	18 21	9 17	3 —	— —	— —	Right tonsil clear, slough still on left. T. 99, P. 100
W.K.	35	Pharyngitis, cervical glands. T. 98, P. 110.	"	A. strep. ++	Gamma strep. +	1. 10,500 2. 9,100	50 56	3 8	41 33	4 1	2 2	— —	Normal
M.K.	34	Slough on both tonsils. T. 99, P. 110.	"	A. strep. ++	B. strep. +	1. 12,200 2. 9,000	56 54	16 4	22 37	5 3	1 2	— —	Normal
B.S.	20	Slough on both tonsils. T. 101, P. 110.	"	B. strep. +++ Haem. staph. +++	B. strep. ++	1. 16,900 2. 17,600	67 74	1 3	29 21	3 2	— —	— —	Normal
MODERATELY SEVERE TONSILLITIS													
C.F.	11	Pharyngitis, enlarged cervical glands. T. 102, P. 120.	Inject.	B. strep. ++	B. strep. +	1. 16,400 2. 19,600	65 50	11 14	23 35	— 1	1 —	— —	Improving. T. 99, P. 100
J.J.	27	Pharyngitis, cervical glands. T. 100, P. 120.	"	B. strep. ++	No growth	1. 8,900 2. 8,900	58 56	5 2	27 37	7 3	2 2	1 —	Normal
K.K.	28	Pharyngitis, cervical glands. T. 100, P. 120.	"	B. strep. +	B. strep. +	1. 12,300 2. 12,400	72 60	9 5	16 30	3 3	— 1	— 1	No change (virus?). T. 100, P. 120
D.L.	51	Sore throat. T. 100, P. 90.	"	A. strep. +	No growth	1. 9,600 2. 9,500	70 46	5 3	18 47	7 3	— 1	— —	Normal
L.M.	8	Upper resp. infection and tonsillitis. T. 101, P. 120.	"	Staph. and *N. catarrhalis*	Non-haem. strep. +	1. 16,900 2. 12,200	65 20	6 5	19 66	6 —	3 4	1 3	Normal
S.A.	28	Pharyngitis, left tonsil enlarged. T. 99, P. 78.	Oral	A. strep. +++	Non-haem. strep. +	1. 9,300 2. 8,100	57 67	5 6	33 32	2 8	2 5	1 2	Left tonsil still enlarged. T. 98, P. 70
D.E.	20	Sore throat. T. 101, P. 100.	"	A. strep. ++	Non-haem. strep. +	1. 12,800 2. 10,400	70 54	9 9	19 14	— 19	2 4	— —	Normal
S.H.	8	Mild tonsillitis. T. 98.4, P. 90.	"	A. strep. ++	A. strep. +	1. 8,200	48	3	45	—	3	—	Normal
T.T.	12	Pharyngitis. T. 100, P. 80.	"	B. strep. ++ Staph. +	No growth	1. 7,200 2. 7,100	44 47	10 10	38 34	7 8	— —	1 1	Improved. T. 99, P. 80
OTITIS MEDIA AND PHARYNGITIS													
D.A.	14	Pharyngitis, discharge from left ear. T. 99, P. 80.	Inject.	Throat no growth. Ear haem. staph.	Haem. staph. ++ Non-haem. staph. + Haem. staph. +	1. 9,400 2. 8,700	71 58	9 9	19 29	1 2	— 2	— —	Pharynx normal. Discharge from left ear. T. 98.4, P. 80
L.D.	28	Pharyngitis, slough about one molar. T. 100, P. 90.	"	Throat B. strep. ++ Tooth B. strep. ++	No growth No growth	1. 8,400 2. 10,900	40 26	2 2	46 62	1 —	4 —	1 1	Slight pharyngitis, almost normal. T. 98, P. 80
R.N.	10	Coryza, left tympanum inflamed. T. 98.4, P. 100.	"	Throat Haem. staph. ++ A. strep. ++	Non-haem. staph. + A. strep. +	1. 9,500 2. 9,100	38 36	2 5	56 54	— —	1 5	2 —	No coryza. Tympanum almost normal.
J.V.	7	Coryza, pharyngitis, left tympanum inflamed. T. 98, P. 70.	"	Throat A. strep. +++	Non-haem. strep. +	1. 10,200 2. 13,900	44 29	2 4	46 60	2 1	6 5	— 1	Pharynx improved. Tympanum slightly red.

TABLE II.—(*Continued*)

Case	Age	Pre-treatment signs and symptoms	Treatment route	Organisms cultured		W.B.C./mm³. (total)	Differential WC—(%)						Clinical assessment Third day of treatment
				Before treatment	48 hours after treatment		Old	Y	L	Mon.	Eos.	Bas.	
Y.G.	10	Pharyngitis, purulent discharge from left ear. T. 97.4, P. 92.	Oral	Throat pneumococcus Ear A. strep. +++	No growth Haem. staph. +	1. 8,400 2. 6,800	53 57	4 —	37 35	3 5	2 2	— 1	Pharynx normal. No change in ear discharge
F.K.	7	Coryza, tonsillitis and bulging left tympanum. T. 100, P. 90.	"	Throat A. strep. ++++	A. strep. ++	1. 13,000 2. 9,900	39 33	4 3	55 56	2 2	— 5	— 1	No tonsillitis, slight inflammation of tympanum. T. 98, P. 80
A.L.	7	Bilateral otitis media with left perforation and discharge. T. 99, P. 90.	"	Throat Pneumococci ++	Non-haem. strep. +	1. 7,300 2. 6,300	60 26	6 11	31 61	3 1	— 1	— —	No discharge, normal. Perforation healing
MISCELLANEOUS INFECTIONS													
A.C.	60	Sore throat, laryngitis, cough. T. 99, P. 90.	Inject.	*A. strep. ++	Negative	1. 5,500	34	5	57	2	1	1	No change. T. 98, P. 80
L.D.	17	Sore throat, pharyngitis, cough. T. 101, P. 100.	"	A. strep.	Negative	1. 6,600	40	6	48	5	—	1	Normal. T. 98, P. 80
W.D.	48	Sore throat, pharyngitis. T. 101, P. 100.	"	A. strep. ++ Non-haem. staph.	Negative	1. 6,300 2. 4,700	37 47	27 3	23 46	7 2	5 1	1 1	Slight pharyngitis T. 98, P. 80
P.K.	32	Sore throat, pharyngitis. T. 101, P. 110.	"	Strep. ++	Negative	1. 6,900 2. 5,600	74 66	6 4	16 26	3 4	— —	1 —	Slight improvement T. 100, P. 100
G.L.	68	Sore throat, laryngitis, pharyngitis. T. 98.4, P. 80.	"	A. strep. +	Yeast	1. 9,500 2. 6,300	40 50	5 7	55 34	— —	— 8	— 1	Pharynx only improving
N.S.	16	Sore throat, pharyngitis, tender cervical glands. T. 99, P. 80.	"	No growth	Occasional strep.	1. 12,300 2. 8,100	62 51	1 3	33 44	— 1	2 1	2 —	Improving
J.S.	26	Sore throat, pharyngitis. T. 98, P. 90.	"	Negative	Strep. +	1. 12,300	45	23	27	4	1	—	Improving
O.Y.	43	Dyspnœa, chest pain, pneumonia. T. 103, P. 130.	"	Pneumococcus ++++	Negative	1. 20,400	72	8	19	—	—	—	Improving. T. 98, P. 90
J.D.	45	Sore throat, pharyngitis, laryngitis, cough. T. 104, P. 120.	Oral	Negative	Negative	1. 3,500 2. 3,000	36 42	10 11	47 42	4 3	1 1	1 —	Less cough, less pharyngitis T. 98, P. 90
L.R.	48	Sore throat, pharyngitis. T. 100, P. 88.	"	*Gram-neg. bact. +++	Strep. +	1. 5,000 2. 6,500	45 42	3 3	49 49	2 5	— —	1 1	Normal. T. 98.4, P. 66
J.S.	7	Cough, bronchopneumonia. T. 101, P. 130.	"	Haem. staph. aureus ++	No growth	1. 6,700 2. 5,200	27 15	7 22	52 52	7 7	7 4	— —	No improvement (virus?)
L.H.		Olecranon bursitis.	"	———	———								Less red, less swollen
W.C.	30	Urethral inflammation.	"	Gonococcus	Negative								No inflammation, no discharge

* Penicillin-resistant strains.

1. White count values before treatment.
2. White count values on the second day of treatment.

mal. On the third day in the parenterally treated cases, hæmolytic streptococci disappeared from the throat cultures in all but one case. Two patients in the orally treated group showed disappearance of hæmolytic streptococci, and two showed a substantial decrease in the number of colonies of this organism. In both groups there was a comparable decrease in the total white count on the second treatment day.

Five out of the nine patients classed as having moderately severe tonsillitis were treated by injection and four by oral penicillin. The clinical course during treatment was very similar in both groups. One patient (K.K), in the group receiving parenteral penicillin, showed very little improvement on the third day, and it is thought that this patient had a virus infection with a secondary infection of beta hæmolytic streptococci. Throat cultures in both groups showed diminished or absent growth of hæmolytic streptococci on the third day of treatment.

Among the seven cases of otitis media with pharyngitis, those treated with oral penicillin responded similarly to those treated by injection. On the third day of treatment there was improvement in the appearance of the tympanum and disappearance of the pharyngitis in most cases. One of the two cases with discharge in the orally treated group responded particularly well to oral penicillin. Patient A. L. with bilateral otitis media and perforation of the left tympanum had no discharge, and healing of the perforation on the third day of treatment. Also there was a greater depression in the total white cell count in the orally treated group on the second day.

The remaining 13 cases were classed as miscellaneous infections, as they could not be included in any of the specific clinical categories discussed above. Nine of these cases were in febrile patients with sore throat, laryngitis and pharyngitis, and, with the exception of two, there was no dramatic improvement with treatment. Nevertheless, throat cultures from five of these patients showed disappearance of hæmolytic streptococci on the third treatment day. One patient with bronchopneumonia (Case J. S.), who was treated orally, showed no improvement and his infection was considered to be viral in origin. One case of acute urethritis (Case W. C.) showed disappearance of gonococci (negative smear) 24 hours after initiation of oral penicillin therapy. On the third day of treatment all signs of acute inflammation and discharge had disappeared.

The main advantages of oral penicillin are ease of administration and lowered incidence of anaphylactoid reactions.[10] These advantages are offset to some extent by the necessity of repeated administrations during the day in order to maintain adequate antibacterial blood levels.

The clinical and laboratory data outlined in this report indicate that infections caused by penicillin-sensitive organisms may be effectively treated by two tablets of long-acting oral penicillin daily. Injectable penicillin did not seem to offer any particular therapeutic advantage in the treatment of these patients. The amelioration of symptoms, the alteration or disappearance of the causative organisms, and the changes in the circulating white cells were very similar in all patients, whether they were treated orally or parenterally.

SUMMARY

Long-acting oral penicillin tablets have been compared with parenteral penicillin in the treatment of scarlet fever, tonsillitis, otitis media and a number of miscellaneous infections. It has been shown that the administration of one tablet of long-acting oral penicillin (Falapen) every 12 hours is as effective as 600,000 units of aqueous suspension of procaine penicillin G administered once daily by injection in the treatment of penicillin-sensitive infections.

The author gratefully acknowledges the co-operation of Dr. John Ridge, pathologist, Grace Hospital, Winnipeg, and his staff, for the hæmatological and bacteriological work.

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RÉSUMÉ

L'auteur a comparé le traitement de la scarlatine, de l'amygdalite, de l'otite moyenne et de diverses autres infections par des comprimés de pénicilline orale à action prolongée et par l'administration parenterale de pénicilline. Il a montré que l'ingestion d'un comprimé de Falapen (*marque déposée*) aux 12 heures était aussi efficace que l'injection quotidienne de 600,000 unités de suspension aqueuse de pénicilline—procaïne G, dans le traitement des infections à organismes pénicillo-sensibles.

CEREBROSPINAL FLUID CULTURE IN MULTIPLE SCLEROSIS

A study was undertaken by Mavor, Gallagher and Schumacher (*New England J. Med.*, 260: 860, 1959) to confirm or disprove the reports in recent years which have revived the claim that spirochætes can be demonstrated in sections of central nervous system tissue or cultured from the cerebrospinal fluid of patients with multiple sclerosis. Cerebrospinal fluid specimens for cultivation were collected from 26 patients of whom 12 had multiple sclerosis. The technique of culture is described and the data from the cerebrospinal fluid of the 12 patients with multiple sclerosis are tabulated. Of the 26 specimens six yielded cultures contaminated with Gram-positive bacilli or cocci. All the other cultures remained sterile. The authors refer to recent investigations by other workers and to personal communications with investigators in other institutions who also have been unable to reproduce results reported by Ichelson, who claims to have cultured spirochætes from 59 of 76 patients with multiple sclerosis.

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CONGENITAL ABSENCE OF THE VAGINA

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THE SELECTION of the simplest, safest, and yet the most satisfactory operative procedure to construct an artificial vagina is not readily apparent from a study of our medical literature. My experience with the surgical correction of this problem has led me to prepare this paper, which will review the generally accepted modern methods, mention some of the older techniques, and suggest a simple modification of one which, in two cases, has led to a successful anatomical result.

In any discussion of congenital absence of the vagina, numerous operative procedures suggested in classical monographs must be considered, but generally speaking, these methods may be divided into four types.

1. *Intestinal transplantation,* suggested by Baldwin in 1909, is not today a popular solution to this problem. That it has not been entirely superseded, however, is evident by a report in 1956 from Counseller,[3] who stated that he still utilizes it in cases where there has been failure of epithelialization in grafted or simple reconstruction procedures. Technically, and in functional results, it has many disadvantages. With a prohibitive 20% to 30% operative mortality in Counseller's series, it is in addition æsthetically unsatisfactory because of its origin as well as the intense leukorrhœa which apparently persists from mucous glands of the isolated loop.

2. *Free skin grafts* were used as early as 1872[11] in an attempt to line an artificially created vaginal space with skin. Success, however, was inconstant until 1938, when McIndoe and Banister[4] reported the satisfactory use of a Thiersch graft over a vaginal mould. They were the first to point out the inherent fault in previous methods, in which skin grafts were left in place over a variety of moulds or other space-filling devices for only one to three weeks. McIndoe pointed out that the contracture phase of split-thickness grafts lasted for six months. Leaving the original mould and graft *in situ* for this length of time proved very successful in a high percentage of cases. This technique remains today the popular method for the management of this problem. Its disadvantages are not as serious as those of the Baldwin technique, but some remain. These are:

(a) The vulva and perineal body are mutilated to retain the mould and to occlude temporarily the vaginal space.

(b) The thigh donor site persists as a permanent reminder to the patient that she is abnormal.

(c) Occasionally, the graft fails to "take" in part or in whole, scar tissue or œdematous granulation tissue develops, or hairy areas form in the vaginal space. These problems can, in combination or separately, produce a far from satisfactory result.

3. *Simple pressure* was an older method reintroduced in 1938 by Frank,[12] who pointed out that operation was not necessary in every case of congenital vaginal atresia. By simple pressure in some cases, he showed that by graduated dilators a space could be created of variable depth up to three and a half inches (8.75 cm.). In 1941, Campbell[7] reported that the aplastic canal could be lengthened to three inches in two to four weeks by simple pressure in a series of cases.

4. *Simple reconstruction,* used as early as 1817 by Dupuytren,[8] was reconsidered by Wharton[13] in 1935. He simply created an adequate space and inserted a mould of paraffin or balsa wood covered by a condom to maintain it. The physiological basis of this procedure rested on the supposed ability of the epithelium of the lower vagina to proliferate upwards and epithelialize the upper space, with the assistance of embryologically suited tissue in the area undergoing squamous metaplasia.[1, 10] The disadvantages of this method seem to have been the slowness with which epithelialization proceeded and its occasional total failure to produce skin.

The most complete review of this problem was by Bryan, Nigro and Counseller[6] in 1949, reporting 100 cases from the Mayo Clinic treated by a variety of methods. In September 1956, Counseller[3] brought his series up to date (140), expressing a preference for the free skin graft but recognizing its limitations and problems and occasional failure.

Congenital absence of the vagina is a rare anomaly, with an incidence of about one in 5000 female births. In the Mayo Clinic series of 100 cases, although no uterus could be palpated or found at exploratory laparotomy, 61 showed adequate evidence of secondary sex characteristics indicating the presence of ovarian tissue. In all series there has been a high incidence (40%) of associated urinary abnormalities, and these should always be searched for before definitive therapy.

The opportunity to treat two cases has come my way during the past three years. Both girls were in their late teens, engaged, and hoping to be married in the reasonable future. One had had an exploratory operation, one had not. Both had adequate secondary sexual development and in neither could a uterus be palpated under anæsthesia by rectal examination, and there were no symptoms of cryptomenorrhœa. Neither therefore had a uterus, and the problem of treatment was simply that of vaginal aplasia.

When the particular method of treatment was considered, it was felt that the perfect result would be one in which the patient was left with a vaginal canal and vault similar to those found after total hysterectomy in a nulliparous patient. A two-stage method was chosen, combining the simple pressure method of Frank[12] with the later

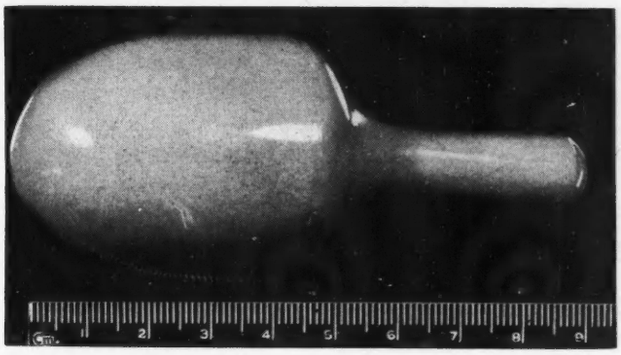

Fig. 1.—Photograph of a mould used in the construction of a vagina.

simple reconstruction method of Wharton.[13] In both instances, the operation has been simple and successful, yet reasonably comfortable from the patient's point of view.

Technique. The mould used is of dental stent (Fig. 1). Its shape is such that it can be used for both stages. The thin stem handle has a small loop at the end, through which quarter-inch (0.6 cm.) Penrose drains can be inserted to provide upward traction and inward pressure by the mould at night, or later, after deeper space is achieved, 24 hours a day.

At the initial procedure, the site of the anatomical introitus is determined under anæsthesia, and a canal to a depth of one to one and a half inches (2.5 - 3.75 cm.) is created by simple pressure, to a point just short of epithelial rupture. The patient can be quickly discharged to continue pressure at home and be booked for readmission to hospital after a month's time.

On this occasion, after adequate cleansing, a small transverse incision is made at the apex of the canal where rectum, bladder, and peritoneal reflection are easily found. When all three are pushed aside, a huge, relatively bloodless space is found and the mould simply inserted. The shape of the mould, with its stem below and its dilated bulb above, requires no fixation, and it lies above the sphincteric vulvar muscles and the levatores ani. Adequate drainage is achieved by gravity.

The advantage of this technique seems to have been the ease with which the original pressure space was achieved, leaving a broad entrance of true skin through the introital muscles which are preserved as one would find in a normal vagina. The pressure space forms approximately one-half of the required canal, leaving a much smaller space to be covered to form the upper vagina by epithelial continuity, metaplasia of müllerian remnants, or by a skin graft, although the latter was not used in either case in this study.

In both cases, the mould was left *in situ* for about four months. In one, epithelialization was completed except for a small area at the vault which quickly closed, with intermittent dilatations and a sulfonamide cream. This patient is now married and without complaint. In the other, epithelialization was nearly complete at four months, but the lining membrane was extremely thin, producing on one occasion a severe local inflammatory reaction, but this rapidly subsided with antibiotic therapy, and epithelialization became complete with local œstrogenic cream. Neither patient had any severe problem during the four-month period the mould was initially retained, the local inflammatory condition coming on after the patient herself began to remove and replace the mould each day. The end result in both cases has been a most capacious vagina, with a mobile vault lined by a satisfactory skin-like epithelium, nearly indistinguishable from a normal vagina.

Summary

The problem of congenital absence of the vagina has been reviewed. A simple method of treatment has been suggested, combining the principles in the first stage of simple pressure to form the lower half of the vagina, and in the second stage simple reconstruction to form the upper vagina. In two cases, an excellent result has been achieved simply, safely and without serious complication.

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Résumé

Les méthodes pour corriger la malformation que présente l'absence congénitale de vagin se divisent en quatre groupes: *a*-la transplantation intestinale (Baldwin, 1909), rarement employée de nos jours à cause de ses risques opératoires et de ses résultats discutables; *b*-les greffes cutanées libres (Heppner, 1872) qui cherchent à épithélialiser une cavité vaginale créée artificiellement. Une bonne prise exige la mise en place d'un mandrin vaginal pour la contention des lambeaux pendant environ six mois. Cette méthode n'est pas sans inconvénients; *c*-la simple pression continue exercée par des dilatateurs gradués peut donner une cavité atteignant jusqu'à 8.75 cm. dans certains cas d'atrésie vaginale; *d*-la reconstruction simple (Dupuytren, 1817), basée sur l'insertion d'une prothèse de paraffine ou de bois mou recouverte d'un condom, dans l'espace intervésico-rectal préalablement ouvert, avec espoir d'épithélialisation de la cavité par métaplasie squameuse d'ébauches qui pourraient s'y trouver.

Cette malformation se présente une fois par environ 5000 naissances. Dans 40% des cas, on découvre des anomalies réno-urétérales. L'auteur a eu recours à une combinaison de la troisième et de la quatrième méthode dans le traitement des deux cas qu'il rapporte. Sa technique opératoire est décrite dans le texte. Un vagin spacieux fut obtenu dans chaque cas.

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Case Reports

PAROXYSMAL TACHYCARDIA DURING THERAPY WITH L-NORADRENALINE

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LITTLER AND MCKENDRICK[1] have recently drawn attention to the fact that L-noradrenaline (L-norepinephrine, levarterenol, Levophed) may cause cardiac arrhythmias in the experimental animal. Further they observed the occurrence of ventricular extrasystoles and bursts of ventricular tachycardia during therapy with L-noradrenaline of patients with myocardial infarction and shock.

We report below the occurrence of paroxysmal tachycardia in two patients with myocardial infarction. In one patient the amount of L-noradrenaline infused was increased and death followed. In the other the L-noradrenaline drip was stopped and sinus rhythm was restored.

CASE 1.—A man aged 47 gave a history typical of myocardial infarction with onset on the same day. On examination he was in great pain and shock. The blood pressure was not obtainable. Meperidine (Demerol), 100 mg., was injected, oxygen was given and he was admitted to hospital. Lead 2 of the electrocardiogram was taken (see Fig. 1) and intravenous infusion of L-noradrenaline was started. Shortly afterwards a blood pressure of 100 mm. Hg was obtained at the wrist. Very soon the blood pressure was again unobtainable and the L-noradrenaline was rapidly stepped up to 24 mg. per 500 c.c. of glucose solution. A second electrocardiogram suggested paroxysmal ventricular tachycardia. Quinidine was given intramuscularly and the L-noradrenaline drip was maintained. He died in pulmonary œdema 45 minutes after admission to hospital.

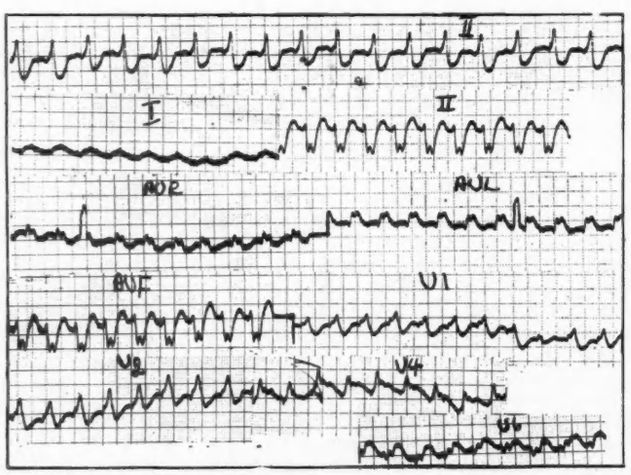

Fig. 1.—Electrocardiograms in Case 1. The top long strip of limb lead 2 was taken before the L-noradrenaline drip was started. It shows a sinus tachycardia at a rate of about 125/minute, and bundle branch block. When the temporary response to L-noradrenaline was not maintained, the remainder of the electrocardiogram was recorded. It shows an absence of P waves, a change of heart rate and a change of wave form in lead 2. This ectopic tachycardia may be ventricular in origin or it may be supraventricular in origin with ventricular aberration.

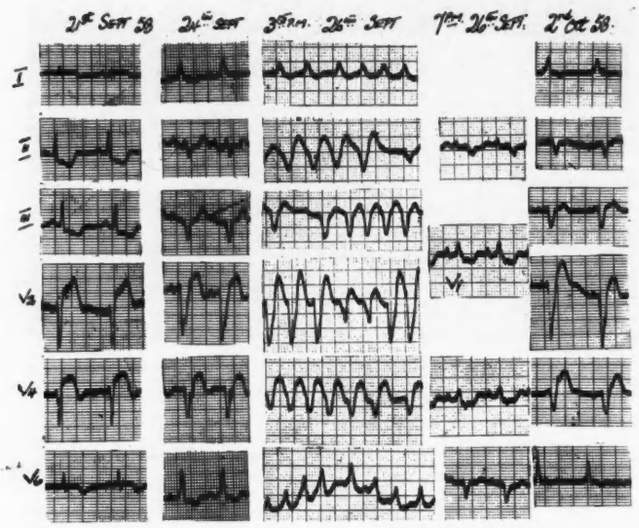

Fig. 2.—Electrocardiograms in Case 2. STT changes of anterior myocardial infarction are present on September 21. The ectopic tachycardia and reversal to sinus rhythm are shown on September 26. Note the transient right bundle branch block at 7 p.m. on September 26, which reverts later to left bundle branch block.

CASE 2.—A man aged 73 admitted to hospital with a history of angina pectoris suffered a typical myocardial infarction on September 20, 1958. Routine treatment was prescribed. On September 24, the blood pressure was 90/50 mm. Hg, and a drip of L-noradrenaline (4 mg./litre of glucose solution) was started at a drip rate of 20 to 40 per minute. The blood pressure was maintained at about 110/70 on this continuing treatment until September 26, when it was found to be 80/60 and the patient was in shock. The drip rate was doubled and an E.C.G. taken at 3.15 p.m. showed an ectopic tachycardia. At 4.10 p.m. the blood pressure was not recordable. The L-noradrenaline drip was discontinued and quinidine was injected intramuscularly. Recovery followed and at 7 p.m. he was again in sinus rhythm. Ten days later the patient died in congestive heart failure. Autopsy showed myocardial infarction, coronary arteriosclerosis and congestive heart failure. There was no evidence of pulmonary infarction.

DISCUSSION

Patients with serious myocardial infarction suffer a fall in cardiac output. It is believed that in some of these patients the fall in cardiac output is moderate but that the failure of compensatory peripheral vasoconstriction leads to serious shock.[2] It is in this group in particular that vasoconstricting agents such as L-noradrenaline or metaraminol will be of value.

Paroxysmal tachycardia complicating myocardial infarction is presumably a result of diminished coronary perfusion and as such it will be initiated and perpetuated by low levels of blood pressure. The use of vasopressor agents is logical in this

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context. If the paroxysmal arrhythmia occurs during therapy with L-noradrenaline, the situation is more complicated. Will an increased delivery of L-noradrenaline raise the blood pressure and abolish the arrhythmia? Or perhaps has the L-noradrenaline triggered off the arrhythmias and has the blood pressure then fallen as a result of the arrhythmia? The approach to the dilemma must be empirical. If a brief trial with a stepped-up delivery of L-noradrenaline does not abolish the ectopic rhythm and raise the blood pressure, it may be wise to desist and use an antiarrhythmic agent instead. Otherwise a combination of vasopressor and an antiarrhythmic agent may be prescribed.

The cases we have reported do not prove that L-noradrenaline causes arrhythmias but they suggest that it might. It is important that attention should be drawn to this possibility, as the latest evidence incriminating L-noradrenaline is impressive. Szakacs and Cannon[3] have reported that "the prominent autopsy findings in patients following treatment with L-norepinephrine and frequently in patients with phæochromocytoma are focal myocarditis and hæmorrhagic lesions of the pericardium and endocardium. An experiment devised to parallel the clinical use of L-NE, using intact dogs and continuous intravenous infusion in therapeutic doses, revealed multiple morphological changes at autopsy. Focal myocarditis was uniformly present in association with subendocardial and subpericardial hæmorrhages." King, Brunson and Bieter[4] have reported cardiac lesions in dogs after the use of a variety of pressor amines, including methoxamine, metaraminol and levarterenol. "The gross changes consisted of subendocardial and epicardial hæmorrhages, areas of myocardial infarction and extensive valvular œdema and hæmorrhage." Melville and Shister[5] reported observations on cardiac responses to epinephrine and norepinephrine in high fat-cholesterol fed rabbits and in control animals. In both groups high doses of these amines produced various forms of arrhythmias including transient or fatal ventricular fibrillation. In line with previously reported observations,[1] Melville and Shister showed that the previous use of atropine partially protected these rabbits against the occurrence of amine-induced arrhythmias.

To end on an entirely adverse note is unwise. McGinn and Schluger[6] have reported the successful use of levarterenol in the treatment of ectopic tachycardias, including its use in the context of paroxysmal tachycardia occurring with myocardial infarction and shock. Continuous electrocardiographic control was maintained by them and they observed transient ventricular arrhythmias in three of their eight cases. They conclude: "Although the duration of the ventricular arrhythmia is usually very brief, when cases of paroxysmal tachycardia are to be treated with levarterenol it might be well to have a solution of procaine amide available for intravenous injection if the ventricular arrhythmia should persist." Corday and associates[7, 8] have reported that "vasopressor drugs may successfully terminate arrhythmias or correct the severe hypotensive state until antiarrhythmic agents have taken effect." They also note that "the vasopressor drugs which may abolish arrhythmias may also cause serious arrhythmias." This last quoted reference[7] leaves the impression that serious arrhythmias are caused by the vasopressor agents only if the blood pressure is raised too high.

SUMMARY

Two cases of paroxysmal tachycardia are reported which occurred whilst L-noradrenaline was being infused into patients with myocardial infarction and shock. It is known that L-noradrenaline may cause ectopic tachycardias, although some authors believe that this occurs only if the blood pressure is raised too high. Myocarditis due to vasopressor agents has now been reported.

L-noradrenaline is established as a valuable vasopressor agent, and may be used as an antiarrhythmic agent. Indiscriminate increase of the amount of drug injected is unwise.

ADDENDUM

Subsequent to the writing of this paper one of us (E.R.G.) has treated a case of resistant paroxysmal ventricular tachycardia. On the first day moderately large doses of procaine amide (Pronestyl) were injected intravenously. On the second day the patient was digitalized on suspicion of a Wolff-Parkinson-White syndrome and the procaine amide was repeated. On the third day 36 grains of quinidine was given by mouth and the procaine amide repeated intravenously. On the fourth day, at 9 a.m. and again at 11 a.m., 9 grains of quinidine was given by mouth. At 11.30 a.m., she was in severe shock, with a heart rate of 220 confirmed by E.C.G. An L-noradrenaline drip (4 mg. per 1000 c.c. glucose) had been running and was now turned on to the most rapid rate possible. The blood pressure returned to 105/70 mm. Hg, no higher. The tachycardia reverted to sinus rhythm.

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ACUTE PANCREATITIS IN PREGNANCY COMPLICATED BY RENAL CORTICAL NECROSIS AND CEREBRAL MUCORMYCOSIS*

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ACUTE PANCREATITIS is very rarely associated with renal cortical necrosis. We were able to find only a single report in the literature of a combination of these lesions.[1] The addition of an uncommon fungous infection made the case to be described even more worthy of record.

A 15-year-old primipara suffered from slight spotting during the last trimester. Towards the end of the 7th month she fell ill with a low-grade fever, anorexia, vomiting and diarrhœa. She was ambulant until the 10th day, when her left cheek became severely painful and the temperature spiked to 104° F. On the next day the patient went into labour and was admitted to hospital. Her temperature was 102° F., the cardiac rate was 120 per minute and the blood pressure 135/80 mm. Hg. After a short uneventful labour a dead child was born. The placenta appeared normal and a necropsy on the baby demonstrated only prematurity.

After 12 hours it was found that the patient's condition had markedly deteriorated. Although she had not lost any undue amount of blood, she was cold, sweaty, pale and slightly jaundiced. The temperature was 97° F. and the blood pressure could not be obtained. She complained of severe pain in the left eye and cheek. The liver was barely palpable but tender, the spleen was enlarged to percussion and dullness was present in the flanks. The hæmoglobin value was 115%, white cell count 13,950 per c.mm. with a differential count of 52 polymorphonuclears, 27 staff cells, 15 lymphocytes, 2 monocytes, 2 plasma cells and 2 immature cells. Serum bilirubin was 14.4 mg. %, alkaline phosphatase 20 King-Armstrong units, total serum proteins 4.4 g. %, albumin 2.7 g. %, globulin 1.7 g. %, thymol turbidity 3 units, thymol flocculation 1 unit. A catheter specimen of urine had a specific gravity of 1012 and contained 1+ protein, no reducing substance or acetone, and 1 white blood cell and 3 red blood cells per high power field after centrifugation.

The patient was placed in an oxygen tent and given intravenous 5% glucose in water containing 8 mg. levarterenol (Levophed) per litre, in sufficient quantity to raise the systolic blood pressure to 100 mm. Hg and to maintain it at that level. Hydrocortisone (100 mg. initial dose, then 50 mg.) and chloramphenicol (Chloromycetin) (250 mg.) were administered every six hours. A gastric tube was passed and suction was applied.

On the following day the patient became irrational. She vomited repeatedly and no bowel sounds could be heard. Since hepatitis was suspected, the serum lactic dehydrogenase level was determined and found to be 2375 units. The serum glutamic oxaloacetic transaminase level remained below 50 units. The plasma sodium was 100 mEq./l., the chlorides 75 mEq./l. The urine excretion during the first 24 hours was only 205 ml.; this was attributed to the disturbed electrolyte balance, and accordingly 87 mEq. NaCl. were given in physiological solution. The intravenous fluids administered during two days totalled 4 litres, yet only 150 ml. of urine was passed on the second day and 80 ml. on the third day. The patient was now œdematous. The hæmoglobin value was 80%. The blood sugar level was found to be 1400 mg. %, and 810 units of regular insulin in divided doses over a two-day period was required to bring it down to normal. The girl, who had been semicomatose, regained consciousness. Meanwhile, the hæmoglobin level had fallen to 44% on the sixth day and four transfusions of 360 c.c. each of packed red cells just managed to hold it at that level.

Gradually renal function returned. On the ninth day the non-protein nitrogen (N.P.N.) was still 251 mg. %, but on the 10th day 1700 c.c. of urine was excreted. The lactic dehydrogenase level decreased to 530 units on the 8th day. The liver function improved, the serum bilirubin on the 8th day being 5 mg. %.

On the 8th day the patient took a turn for the worse. She became listless and developed difficulty in opening the left eye owing to periorbital swelling. The eye became more and more inflamed, with chemosis, exophthalmos and a dilated fixed pupil. Eventually the whole left side of the face became swollen, and pus was discharged from the inflamed hæmorrhagic lids. The temperature remained subnormal. The patient became irrational, finally lapsed into coma and died on the 11th post-partum day.

Postmortem Examination

Necropsy was performed five hours after death. The body was jaundiced; otherwise the only abnormal feature noted on external examination was the severe inflammation around the left eye. All organs were moderately bile-stained. The heart, great vessels and mediastinal structures were normal. The pleural cavities were dry. In the lungs, the posterior half of the left upper lobe was consolidated, firm and dark red. The peritoneum and retroperitoneal tissues, particularly in the upper half of the abdomen, were swollen and œdematous and contained a scattering of opaque, dull, white flecks characteristic of fat necrosis. There was no free fluid. The gastro-intestinal tract was normal. The liver and gall-bladder appeared normal and the ducts were patent. The pancreas was severely swollen and soft, and blotchy red and yellow throughout. In some areas, breakdown of tissue and cystic degeneration had occurred. The spleen was marked by numerous infarcts, mainly in the subcapsular zone. These measured 2 to 3 cm. in diameter, had a serpiginous outline and were yellow with a red border. The kidneys were similarly mottled, the infarcts here measuring 1 to 2 cm. and being more wedgeshaped. About half of the kidneys was thus destroyed (Fig. 1). The vessels of the pancreas and spleen were patent, but thrombus occluded many arcuate branches of the renal arteries. The ureters, bladder and adrenals were normal. The internal genitalia were compatible with an eleven-day post-partum state. The cavity of the uterus contained old clotted blood but this was not considered to be excessive in amount. There was no sign of infection.

In the cranial cavity the retro-orbital tissue on the left side was œdematous and hæmorrhagic. The left

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Fig. 1.—Kidneys, showing multiple cortical infarcts.

cavernous sinus was filled with clotted blood and pus, and the carotid artery in the sinus was thrombosed. Otherwise the basal cerebral vessels and dura were normal. The brain was swollen, particularly the left cerebral hemisphere. The subarachnoid space over the left temporal pole and undersurface of the frontal lobe was filled with a thick green exudate. The underlying cortex and white matter were œdematous, soft, congested and greenish.

Microscopical Findings

The consolidated portions of the lungs showed a bronchopneumonia surrounding colonies of an unidentified fungus. The mycelial hyphæ were thin and septate. In the liver, there was severe œdema of the spaces of Disse and bile stasis in the centrilobular region, but no parenchymatous damage.

The pancreas was a mass of confluent areas of necrosis, each surrounded by a broad mantle of disintegrating polymorphonuclear cells (Fig. 2). The interlobar vessels lay just outside the inflammatory zone. The walls of some arteries were infiltrated by polymorphonuclear cells, but the lumina were empty. Many veins were occluded by thrombi showing early organization. The peripancreatic fat was necrotic and partly replaced by granulation tissue.

The spleen contained multiple infarcts of approximately the same age as those in the pancreas. The vessels in these were necrotic and thrombosed. In the healthy areas the arteries were normal, whilst the veins adjacent to the infarcts were frequently filled with thrombi undergoing early organization. The infarcts in the kidney were identical in appearance to those described above. There were, in addition, partly necrotic areas in which the tubular epithelium was dead but the interstitial tissue had remained viable. Arteries running into the infarcts showed necrosis of their walls, sharply limited by the edge of the infarct. Such vessels were usually thrombosed and the clot frequently extended outward into the healthy parenchyma and, as could be demonstrated by serial sections, even into the interlobar arteries. In the viable areas, organization of the thrombus had taken place, a process which was complete in the smaller vessels and incipient in the larger ones. The tissue between the infarcts was normal. The generative organs and the breasts showed only puerperal changes.

Fig. 2.—Pancreas. The tissue is infarcted. There is a surrounding inflammatory zone and venous thrombosis is present. Hæmatoxylin and eosin × 35.

The carotid artery in the left cavernous sinus and its branches in the area of gross softening were filled with clot and the broad branching nonseptate hyphæ characteristic of the mould Mucor (Fig. 3). These penetrated the walls of the arteries, worming their way through gaps in the internal elastic lamina into the surrounding tissue, which was necrotic and infiltrated by polymorphonuclear leukocytes. The 5th nerve, retro-orbital tissue, cavernous sinus and pituitary gland were similarly involved by the fungus. The other organs appeared normal.

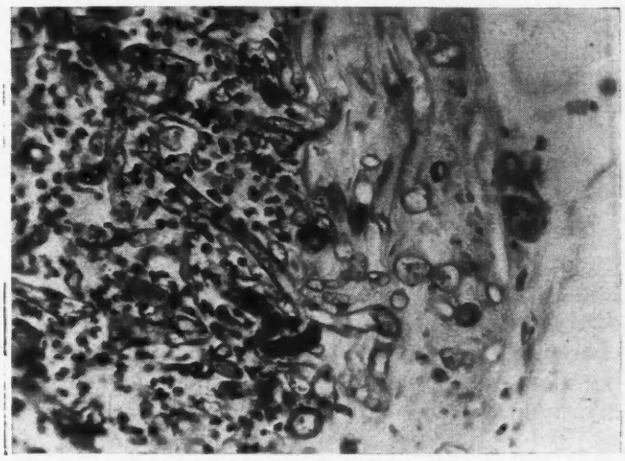

Fig. 3.—Internal carotid artery (branch). Large nonseptate fungal hyphæ penetrate the wall. Hæmatoxylin and eosin × 375.

Bacteriology

Swabs taken from the brain and orbit at postmortem were overgrown by fæcal contaminants. Lung cultures yielded only *Monilia albicans*.

DISCUSSION

A reconstruction of the clinical history in the light of the pathological findings allows the following conclusions to be drawn. The slight spotting was probably caused by premature separation of the placenta but was of no clinical significance. A general infection, including maxillary sinusitis and accompanied by high fever, induced a miscarriage. The next event was massive necrosis of the pancreas as indicated by shock, jaundice (compression

of the bile duct by the swollen pancreatic head), and dullness in the flanks (free fluid). It is likely that the renal and splenic infarction occurred at about the same time, although the symptoms were overshadowed by the pancreatic catastrophe, for oliguria occurred during the first 24 hours and the spleen was enlarged to percussion within 12 hours. Moreover, all the lesions microscopically seemed to be about the same age. The extensive areas of necrotic tissues liberated large amounts of lactic dehydrogenase. The hæmolytic anæmia was caused by uræmia.[2, 3]

The remarkably high level of blood glucose (1400 mg. %) resulted from a number of coincidences. The total destruction of the islets of Langerhans had led to diabetes mellitus. In addition to this, the patient was receiving intravenous glucose and was unable to rid herself of any excess of sugar, since she was oliguric.

Despite the many abdominal insults the girl had suffered, she appeared to be improving as soon as the diabetes had been controlled. The damage to the kidneys and spleen was compatible with life, since about half of the parenchyma remained. It is surprising, however, that she survived the shock of the complete pancreatic necrosis, which has a high mortality rate. The patient's youth may have been the decisive factor.

The cause of death was mucormycosis of the brain. Inflammation of the eye and maxillary sinus had been one of the earliest complaints but it is doubtful whether this was initially mycotic in character. Mucor may have been present as a harmless saprophyte which became virulent and invasive only when the acquired diabetes mellitus and the administration of cortisone and antibiotics, all predisposing factors, made the patient susceptible to this infection.

Mucormycosis, caused by the family Mucoraceæ, particularly the genera Mucor and especially Rhizopus, is being increasingly reported in the American literature, since Baker[4] drew attention to it. Although any part of the body may be attacked by these ubiquitous and usually non-pathogenic fungi, the meninges and brain are the most common sites involved and often are infected through the orbit and paranasal sinuses. Large non-septate hyphæ and a great affinity for arteries with subsequent thrombosis are characteristic of this fungus. Mucormycosis may be associated with a variety of debilitating diseases, but most of all with diabetes mellitus. This seems to be due to the diabetic's lowered resistance to any infection; our patient, for example, had also bronchopneumonia caused by a different fungus. Cerebral mucormycosis is nearly always fatal, but the occasional patient has recovered.[5]

Pancreatitis occurs only rarely during pregnancy, since it usually affects women past the childbearing age. Despite many theories, the etiology is still unknown. Among predisposing conditions are general infections, in which the pancreas is either directly infected through the blood stream or perhaps may serve as the target organ for an allergic mechanism. Utilizing the Shwartzman phenomenon of local sensitization, a fulminating hæmorrhagic pancreatitis has been produced in animals by introducing bacterial endotoxins into the pancreatic duct and later giving an intravenous injection of the same material.[6] Pregnancy, although usually considered coincidental to pancreatitis,[7, 8] may be important here, for pregnant rabbits tend to develop the generalized Shwartzman reaction even after a single injection of toxin.[8]

Renal cortical necrosis is a well-recognized complication of pregnancy, particularly of uterine apoplexy, and splenic infarcts have been recorded in association with it since the early years.[10] In the non-pregnant patient, infections are the most important antecedent. The exact pathogenesis is unknown in most cases, although in animals vascular spasm has been proved to be sometimes responsible.[11] Renal cortical necrosis can be produced experimentally in many different ways[12] but it is one of the most consistent changes of the generalized Shwartzman phenomenon.[13, 14]

In view of the similar histological appearance of the lesions in the pancreas, kidneys and spleen in our case, it is tempting to postulate the same etiology for all and to invoke the Shwartzman phenomenon. There was a preceding infection, and pregnancy may have rendered the patient more susceptible. Capillary and venous thromboses are the hallmark of the Shwartzman reaction and the latter was present around the infarcts. In conclusion, however, one must concede that this theory cannot be proved and that it may not be always warranted to transfer the results of animal experimentation to the natural disease in man.

SUMMARY

A case is reported of a young pregnant girl in whom a general infection induced a miscarriage. This was followed by massive pancreatic necrosis and renal and splenic infarcts. The destruction of the islets of Langerhans resulted in diabetes mellitus, which in turn led to fatal cerebral mucormycosis.

We are indebted to Dr. L. G. Cohen for the clinical details.

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PEMPHIGUS VULGARIS OR ERYTHEMA MULTIFORME?*

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BRENNAN AND MONTGOMERY[1] correlated the clinical and pathological findings in pemphigus and other bullous dermatoses. They classified the lesions on the basis of the presence or absence of acantholysis. The phenomenon of acantholysis is seen in pemphigus and not in other bullous dermatoses except those caused by viral diseases. Acantholysis is the loss of prickles of the prickle cells in the epidermis with lysis of the cell. This change is a primary one in pemphigus and is not due to pressure or tension phenomena, as in other bullous dermatoses.

Of 45 biopsies from patients considered to have pemphigus vulgaris, 25 revealed the presence of acantholytic bullæ. Of the 25 patients in whom acantholysis was found, 20 had died within two years despite extensive treatment. The remaining five, all of whom were diagnosed within the year of the report, were still alive. Follow-up studies disclosed that none of the 20 patients who did not show acantholysis had died from pemphigus. Histopathologically it was considered that true pemphigus had definite features distinct from other forms of so-called pemphigus and bullous dermatoses.

The case reported below was originally diagnosed clinically as pemphigus vulgaris. This diagnosis was substantiated by reputable pathological examination. Review of the biopsy slide elsewhere failed to demonstrate the presence of acantholysis of the cell structure, and the diagnosis of pemphigus was ruled out. The benign nature of the lesion was subsequently borne out by the complete recovery of the patient.

A 24-year-old white linesman entered St. Mary's Hospital on April 17, 1955. For four days before admission, he experienced mild aches and pains in the legs and low back and had a mild non-productive cough and sore throat. He thought that he had some fever in the evenings. On the day of admission, his mouth and tongue became quite sore and swallowing was painful.

On admission he was lethargic, feverish, pale and toxic-looking. His temperature was 102° F. His breath had a foul odour. At the time of admission positive manifestations were confined to the oral cavity. On the buccal mucous membrane were small vesicles and bullæ in various stages of formation. Some of the bullæ had burst and a hæmorrhagic crust had developed. There were elevated dark inflammatory areas on the hard palate and pharynx. These were later to form bullæ, erupt, and then form hæmorrhagic crusting.

On the second day in hospital his mouth and lips were covered with bullæ, and crusting was so severe that he was unable to take food or drink. At this time, bullæ appeared on the trunk, arms and legs, ranging in size from the vesicles commonly seen in chickenpox to large blisters several centimetres in diameter. The anal region became involved, as well as the glans penis and urethral meatus. On the evening of the second day the temperature reached 104° F. and the bullous process was accelerating.

Owing to the widespread involvement of lesions and the almost moribund state of the patient, a tentative diagnosis of pemphigus vulgaris was made pending biopsy study of a lesion. Cortisone therapy, 100 mg. every four hours intramuscularly, was begun.

The pathological report in part was as follows: "Section shows a fragment of skin. The upper layers of the epidermis are separated from the basal layers by a cavity (epidermolysis). The fluid content of this cavity has escaped, but it contains a few cells, many of which appear to be eosinophils. The underlying dermis shows a patchy inflammatory infiltration, particularly around small blood vessels. The cells are chiefly lymphocytes. The skin lesion seems to correspond well with the clinical diagnosis of pemphigus vulgaris. Diagnosis: Pemphigus vulgaris."

After one week of cortisone therapy, during which time the patient was sustained on intravenous nourishment including blood transfusions, there appeared to be definite improvement in his condition. Vesicle formation ceased, the temperature returned to normal, and the patient soon was able to take nourishment by mouth. Cortisone dosage was gradually reduced from this time on, and on his discharge from hospital on May 8 (three weeks after admission) he was on prednisone (Meticorten) 5 mg. three times a day. Meticorten dosage was further decreased at home and discontinued on May 27. Examination of the patient at that time showed no evidence of recurrence. He was in good health.

As pemphigus vulgaris is considered to have a serious prognosis despite steroid therapy, it was decided to seek further consultation on the biopsy. Accordingly, the slide was reviewed by Montgomery, whose comment in part was as follows: "The section simply shows tension or pressure bullæ and reveals no evidence of acantholysis. . . . Until a few years ago I would have made a diagnosis of pemphigus vulgaris, but in view of the studies done by Brennan and myself and before that by various French, Belgian and British dermatologists and pathologists, this should be one of the dermatoses in which tension or pressure bullæ are present such as dermatitis herpetiformis or erythema multiforme. The absence of acantholysis would rule out true forms of pemphigus unless the lesion biopsied was an old one."

In retrospect the diagnosis of erythema multiforme bullosa was fairly evident, supported of course by the complete recovery of the patient. In ruling out dermatitis herpetiformis the following points were considered: (1) the comparative rarity of the condition; (2) the preponderance of oral lesions in this case, not common in dermatitis herpetiformis. The remittent nature of the eruption and intense itching described in dermatitis herpetiformis were not present here.

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The patient has been followed up since 1955 and was seen last in December 1958. There has been no recurrence of the disease.

DISCUSSION

The case presented illustrates the difficulties in making a diagnosis of erythema multiforme when it presents itself as a rapidly spreading bullous eruption with severe constitutional symptoms. The first pathological report corroborated the clinical diagnosis and presaged a very grave prognosis. By the time the biopsy was reviewed the patient had recovered, and this of course substantiated the final pathological diagnosis.

It would appear that the presence or absence of acantholysis is the determining factor in separating the grave from the benign, and would, of course, determine pretty definitely the therapeutic approach. It is difficult to say what benefit, if any, was effected by the rather heroic steroid therapy given to this patient.

ADDENDUM

Since the completion of this case report an article on bullous dermatoses has appeared in the May 1959 number of *Medical Clinics of North America*.[2] In describing the Stevens Johnson type of erythema multiforme, reference is made to the therapeutic value of ACTH. An overall mortality of 18% is cited in this series. Mention is made of the phenomenon of acantholysis in the diagnosis of pemphigus vulgaris.[2]

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ALOPECIA MUCINOSA: TWO CASES IN THE SAME FAMILY*

EDWARD S. MERCANTINI, M.D.,† *Ottawa, Ont.* and ROBERT J. SCHOENFELD, M.D.,‡ *Birmingham, Mich., U.S.A.*.

SINCE PINKUS[1] first described alopecia mucinosa in 1957, a number of cases have been observed and reported. Many of these cases have been diagnosed on review of biopsy material, or on biopsy of a puzzling dermatosis. The authors have had the privilege of studying under Dr. Pinkus, and personally observing a number of cases of this particular disease, and they now feel that this entity is a great deal more prevalent than the number of reported cases would indicate. It is hoped that this report may increase awareness of alopecia mucinosa, so that more cases may be found and followed up and a more accurate concept of the disease be developed.

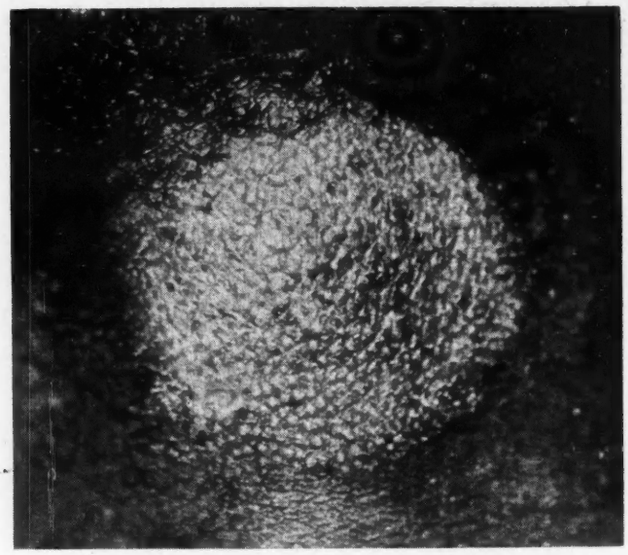

Fig. 1.—Initial clinical lesion on posterior neck.

The definite diagnosis of alopecia mucinosa can be made only by biopsy and microscopic examination, but the authors feel that a fairly certain provisional diagnosis can be made on clinical appearance alone. The cases here reported illustrate the various clinical lesions of alopecia mucinosa very well.

CASE 1*: B.D., a coloured male, aged 15, of good general health, was first seen on March 17, 1958, with the complaint of a "swelling on the back of the neck", present for about nine months. There was no pain associated with this, but he complained of a mild pruritus in the affected area. On examination there was a well-demarcated hyperpigmented plaque 4 cm. in diameter on the right side of the neck posteriorly at the hairline (Fig. 1). The lesion felt doughy to the palpating finger. Most hairs were broken off at the follicular openings, and an acuminate hyperkeratotic plug was prominent in each pore. Some hairs were longer and easily epilated, the external sheath clinging to the hair. Epilated hairs and scrapings of the skin were examined after the application of 10% potassium hydroxide preparation, and failed to show fungal elements. Repeated cultures of hairs and scrapings on Sabouraud's agar produced no growth. Results of laboratory studies were all within normal limits. A punch biopsy taken from the neck lesion on March 24, 1958, was reported by Dr. Hermann Pinkus as follows: "The sections contain epidermis, corium, and subcutaneous fat tissue, and include several large hair follicles. The epidermis is moderately acanthotic and shows intercellular œdema. The latter is more pronounced in the outer root sheaths of hair follicles and becomes extreme in the region of the sebaceous glands. These are transformed into myxomatous-looking tissue, with stringy basophilic material between stellate epithelial cells. The lumen of the follicles is widened and contains keratinous material surrounding the hair. There

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*This case was the basis for a report by Pinkus and Schoenfeld. "Weiteres zur Alopecia Mucinosa", *Hautarzt*, in press.

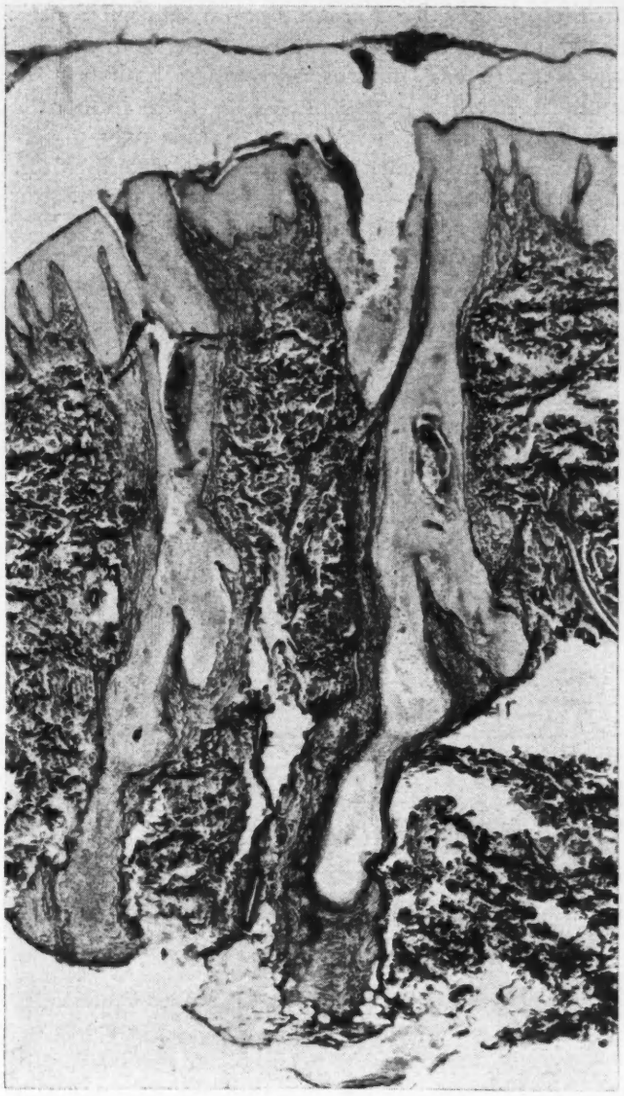

Fig. 2.—Section stained with hæmatoxylin and eosin. × 30.

is moderate cellular infiltrate of lymphocytes, larger mononuclear cells and some eosinophils. The infiltrate surrounds hair follicles and is more pronounced in the subepidermal zone. Diagnosis: Alopecia mucinosa." (Fig. 2.)

On May 21, 1958, an area of partial alopecia was noted on the left eyebrow, and on June 9, 1958, the right eyebrow was also affected; in addition, there were dime-sized areas of alopecia on the left parietal scalp and on the pubic area. The site of the original lesion on the neck was given 75 r units of superficial x-ray therapy at 100 kV with no filtration at weekly intervals for a total of 300 r. After this therapy, the original site was much less œdematous and the follicular openings were less prominent and not hyperkeratotic. During the month of July 1958, the patient was seen on several occasions and new lesions appeared on the left knee, on the posterior aspects of both arms and on the back (Figs. 3 and 4). These lesions consisted of grouped discrete follicular papules in areas 1.5 to 3 cm. in diameter. The patient was under observation for the next several months without treatment. During a period of 10 days in November 1958, all his lesions involuted leaving no trace, with full re-growth of hair on scalp, eyebrows and pubic area as of April 1959.

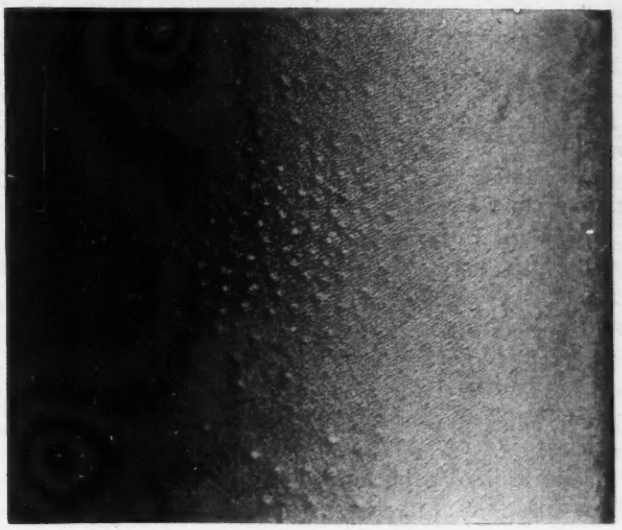

Fig. 3.—Follicular papular lesions on arm.

CASE 2.—On August 2, 1958, M.D., the mother of the patient in Case 1, aged 38, presented with a lesion 2 cm. in diameter on the right side of the posterior neck, consisting of discrete follicular papules. No hairs were evident in the lesion, which had been present for several days and was mildly pruritic. Her general health was good. Results of routine laboratory examinations were normal. The lesion was excised *in toto* and its microscopic structure as reported by Dr. Hermann Pinkus was as follows: "The epidermis shows no remarkable changes. There is some œdema and mild perivascular infiltrate of lymphocytes in the subpapillary layer. Of half a dozen hair follicles present in the sections, only one has a small sebaceous gland. The others show solid epithelial protrusions with more or less intercellular œdema in the place ordinarily occupied by the sebaceous gland. The outer root sheath of the follicles also shows intercellular œdema, especially in its lower half. There are vesicular spaces filled with rounded-off epithelial cells in the upper half of the follicular sheaths. Some follicles contain hairs in the club hair stage, others contain only parakeratotic plugs. There is moderate perifollicular round cell infiltrate. Stains for mucin using toluidine blue, thionin, mucicarmine, and the Alcein blue-PAS procedure reveal the presence of metachromatic acid mucopolysaccharides in the œdematous portions of the hair follicles. Diagnosis: Alopecia mucinosa."

Fig. 4.—Follicular papular lesions on the back.

The patient was followed up for nine months after this single episode, and she developed no further lesions.

COMMENT

As noted in the case reports, and as observed in several other cases, the most prominent lesions are follicular papules. These may be œdematous or not, and there may or may not be associated erythema. These follicular papules may still contain hairs which are often surrounded by a sheath of hyperkeratosis. These remaining hairs are often distorted and clubbed.[2] There is definite alopecia in these lesions and they are well circumscribed.

This follicular papular lesion when not œdematous may simulate lichen nitidus. Other follicular papular eruptions to be differentiated are keratosis pilaris, lichen spinulosus and lichen scrofulosorum.

When these follicular papules are œdematous and erythematous, with associated alopecia, they resemble a mild to moderately severe kerion. Such lesions on the scalp are quite similar to tinea capitis in its various forms but there are usually lesions elsewhere on the body which aid in making the diagnosis of alopecia mucinosa. Other entities to be differentiated are lichen simplex chronicus and contact dermatitis.

Our Case 1, presented here, illustrated a further type of lesion, in the patches of poorly demarcated alopecia on the eyebrows, left parietal scalp and pubic area. The hair loss was incomplete in that some hairs of normal appearance remained within the confines of the lesions. Thus alopecia areata is also to be considered in the differential diagnosis.

Microscopic examination of lesions of alopecia mucinosa shows œdema and mucinous degeneration of the hair follicles and sebaceous glands. Mucinosa cysts form in these structures, and a moderate amount of inflammatory infiltrate is present about the involved hair follicle. There is only a slight amount of infiltrate about the vessels in the corium and the epidermis is not markedly involved. The material within the cysts is mucin, and stains as such with the various polysaccharide stains. These are well illustrated in colour in the article by Johnson, Higdon and Helwig.[3] The mucinous change apparently does not involve the base of the hair papilla in most cases, and the hair is able to regenerate when the disease process subsides.

The etiology of alopecia mucinosa is unknown. The self-healing course and the pathological picture suggest a virus infection. The cases reported here within one family lend support to the concept of virus etiology. Attempts at isolating an infectious agent have been unsuccessful. Cases of alopecia mucinosa associated with lymphoblastoma[4] are apparently secondary to that disease. None of the other cases observed or reported have shown any association with malignant disease.

The course of alopecia mucinosa is apparently variable. Some of the cases clear readily either with no therapy or with a small amount of roentgen irradiation. The lesions may persist for from several weeks to several months, but others may not respond to irradiation and persist for 12 to 18 months and longer. Cases of recurrent lesions over a period of several years have been reported. More cases must be observed to accurately define the clinical course of alopecia mucinosa.

SUMMARY

A discussion of the entity alopecia mucinosa, with the differential diagnosis, is presented. Two reports of cases occurring in the same family are given, which lend support to the possible infectious etiology of this recently described dermatosis.

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SHORT COMMUNICATION

PHOTOGRAPHING THE PROJECTED IMAGE IN THE LECTURE ROOM

DONALD J. CURRIE, M.D.,* and ARTHUR SMIALOWSKI,* *Toronto*

A LARGE AMOUNT of information can be delivered in a short lecture, particularly when the talk is illustrated by lantern slides. Members of the audience who are anxious to record this information may make notes or use a portable tape recorder. The camera can make a record of the projected image rapidly and efficiently with little disturbance to other members of the audience. The taking of these photographs allows the members of the audience to concentrate more fully on the spoken word, and it may be the only record required of the lecture. Line drawings, typewritten material, and printed tables are the subjects most frequently photographed in the lecture hall.

CAMERA

Any miniature or sub-miniature camera can be used successfully for photographing the projected image. The camera should have an accurate view and range finder and a lens whose maximum aperture is about *f*:3.5. The miniature camera is preferred because it is small, it has a large film capacity and it is well adapted for rapid sequence

*St. Michael's Hospital, Toronto.

exposures. The sub-miniature camera is suitable if fine-grain film and a meticulous processing technique are used. The polaroid camera has the advantage that finished prints or transparencies are available in several minutes. It is not suitable when photographs have to be taken more often than once every few minutes.

FILM

For most purposes, black and white film is preferred, as it has wide exposure latitude. Monochrome films are available in a variety of emulsions of varying speed, colour sensitivity, contrast and fineness of grain. A film speed of A.S.A. 100-200 and of normal contrast is preferred. Fast colour film may be used, but the colour temperature of the projected image may not be suitable.

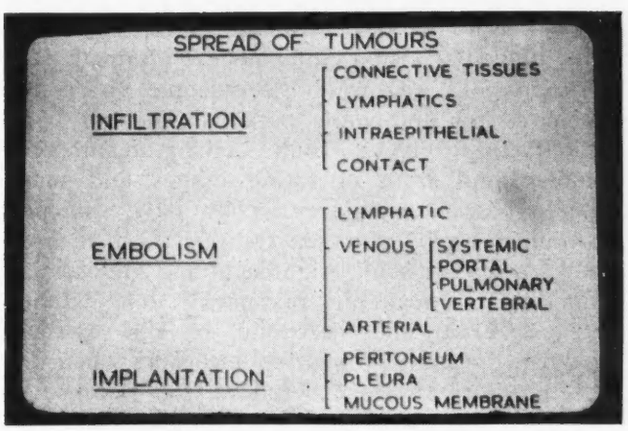

Fig. 1.—A photograph of the projected image of a line drawing. The exposure based on an exposure meter reading was *f*:5.6 and 1/15 second.

VIEWPOINT

The ideal position for photographing the projected image is close to the projection axis and the screen, so that the projected image fills the viewfinder. The screen is brightest at the projection axis and there is a minimum of image distortion. A suitable viewpoint is chosen before the lecture begins.

Fig. 2.—A photograph of the projected image of a 35 mm. Kodachrome transparency. As the original slide was dark, the exposure was increased by two stops, i.e. *f*:2.0 and 1/15 second.

FILM A.S.A. 100	
1/15 sec.	f:5.6
HALFTONE	f:4

Fig. 3.—A standard form for posting exposure information for important lectures. The information is derived from an exposure meter reading or test exposures. Once the exposure is determined for one lecture hall, the only variation will be due to the brilliance of the transparency.

CAMERA SUPPORT

The camera must be immobile during the exposure, as long exposures are often necessary and camera-shake will blur the image. The photographer steadies the camera against his forehead and braces his arms by resting his elbows on the arm rests of the chair or against his body. The camera can be held more steady after exhaling. A tripod is not recommended, as it is inconvenient and it may trip late arrivals.

EXPOSURE

The most accurate determination of the exposure is by a reflected light exposure meter reading taken from the projection screen at a distance of two to three feet with the projector on and no slide in the carrier. The lecture hall lights do not have to be turned off for this meter reading. An exposure based on this exposure meter reading will be suitable for brilliant slides such as line drawings or typewritten material. Half-tone illustrations will require an increase of twice this exposure. Although fast colour films seldom have an exposure latitude of more than one stop, most monochrome films will make satisfactory records with an over-exposure or under-exposure of as much as two stops.

It is suggested that for large and important meetings the hosts post exposure information for photographs of the projected image of one film speed. Photographers using film of faster or slower speed will be able to adjust their exposure accordingly. Bracket exposures may be taken when it is very important to have a record.

The photography of the projected image has become a popular method of making permanent records of illustrated lectures. For the benefit of the members of the audience who wish to take such photographs, it is suggested that an exposure setting be given.

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THE PROBLEM OF UNILATERAL AMBLYOPIA

> *"Although present-day knowledge regarding the diagnosis, treatment and prevention of diseases and the maintenance of normal health is incomplete, it is far in advance of the application of that knowledge to the needs of individuals, families or communities. There is a great lag between that which is known and that which is applied."*
>
> —WILLARD C. RAPPLEYE, M.D.,[1] Former Dean, Faculty of Medicine, Columbia University, in commencement address at Cornell University Medical College, 1955.

Unilateral amblyopia (amblyopia ex anopsia: "lazy eye") is a common and serious defect of vision. Remediable if treated early, it nevertheless becomes a lasting disability in 3 to 6% of people. This large number of cases is due almost entirely to neglect of the eyes during the first few years of life.

The condition has its onset during the first six years, and treatment instituted during this time is usually successful in restoring vision. The sooner treatment is begun, the higher the success rate. Although recently developed methods of treatment (pleoptics, euthyscopy[2, 3]) are offering some hope for deeply established or neglected cases, the chances for the restoration of normal vision decline rapidly after the age of five or six.

More than half of the cases develop in association with strabismus. But another large group is due to unequal refractive errors in the two eyes, and these can only be found by testing the visual acuity.

Small degrees of strabismus can be detected from birth. Although visual acuity can only be estimated grossly during the first three years, by age 3½ correct use of the E-test permits extremely accurate determinations in most children. Colasuonno[4] found that vision could be tested in the following percentages of pre-school children: 3 to 3½ years, 24.4%; 3½ to 4 years, 73.8%; 4 to 4½ years, 91%; 4 years and up, 98%.

Amblyopia can therefore be prevented by annual pre-school vision testing and screening for strabismus. The finding of an ocular muscle imbalance or a unilateral defect of visual acuity in an infant or pre-school child is an indication for immediate referral to an ophthalmologist.

Neither the frequency nor the seriousness of unilateral amblyopia has been generally appreciated. In 1945, among 60,000 selectees for the U.S. Army, Downing[5] found 1920 cases, an incidence of 3.2%. Amblyopia was the reason for 66% of unilateral blindness in these young men. In a more recent study, reported in the *British Medical Journal*, Cole[6] found the condition in 5.27% of 10,000 consecutive National Health patients of all ages. The incidence was no less in patients between 10 and 40 than in those between 40 and 70, indicating that little has been accomplished towards reducing the incidence of this disability during the past half-century. In 60% of the cases, vision in the amblyopic eye was so poor as to be quite useless. In the remaining 40%, binocular vision could not be attained.

Occupations requiring stereoscopic vision are precluded for amblyopic patients. They are prohibited from flying, from driving commercial vehicles, and from operating cranes and many other types of machinery. They have difficulty obtaining employment for compensation reasons. They are the cause of a significant and unnecessary reduction in available manpower for national defence. From the viewpoint of the ophthalmologist, the most serious sequel occurs when disease or injury strikes the fellow eye. Because of the increasing number of older people, with their greater susceptibility to vascular and other degenerative eye diseases, the tragic effects resulting from the lack of a reserve eye are more and more frequently seen.

As Duke-Elder[7] comments, "This enormous number of cases of partial blindness is a grave economic and social matter. That it should be tolerated with complacency is an unpleasant reflection of the neglect shown by modern civilization towards its human material." Here is a situation that should surely be tackled with vigour by the profession. Particularly involved are ophthalmologists, medical educators, public health authorities, pædiatricians and general practitioners. A concerted joint effort by these groups could do much to reduce the incidence of the disease.

A four-fold attack without further delay seems indicated and feasible:

1. *Increased awareness of the problem by the general public* would be desirable. As Blackhurst[8] comments: "The problem appears to be one of universal ignorance of growth and development of vision. Even the most conscientious parents have only limited knowledge about it, and most of them feel secure until a child reaches school age before having the initial eye examination." In a recent study[4] of 610 children, three to five years of age, only ten had had previous vision screening or eye examination.

2. *A greater appreciation by the medical profession of the magnitude of the disability and the numbers of people affected* is needed. A recent editorial[9] in the *British Medical Journal* says: "Medical students often say that ophthalmology is a closed book to them, and many of them are content to leave it at that, even after qualification. The teaching of ophthalmology in the medical schools is for the most part unsatisfactory. Usually so little time is allotted to this subject in the curriculum that nothing but the elements of examination, ocular physiology and the broad principles of disease can be taught. Seldom can the nature of so complicated a disorder as amblyopia be discussed and explained; usually the nearest approach to the subject is the merest outline of the two basic types of squint." More detailed and careful instruction in the correct use of the pupillary light reflex and cover tests and of the E-test is needed, since many pædiatricians and general practitioners are not proficient in their use. Familiarity with the fine points of these simple, basic techniques is essential. The importance of immediate referral of strabismus or other suspected amblyopia cases also needs emphasis.

3. *Pre-school vision screening programs,* such as have been successfully inaugurated in some areas of the United States, are needed in Canada. The National Society for the Prevention of Blindness (U.S.A.) has long advocated the inclusion of vision testing in the total health supervision of the pre-school child, and between 1951 and 1957 established 24 pre-school screening programs in eleven states.[10] Of 22,009 children screened (ages three to five), 1282 referrals for professional care were made, "most of which turned out to be needed referrals". On the local community level these programs were initiated by groups such as alumnæ chapters of Delta Gamma Fraternity, the Junior League, wives of Lions Club members, or local Women's League organizations. Testing was done by carefully trained volunteers, most of whom were mothers of young children. In some areas, the service has been extended beyond the health centres to children in nursery schools. Community responses to these programs were slow at first, but quickly became enthusiastic. Tait[11] says, "There is no question but that these volunteer service groups will increase and may soon be a familiar entity in each area". He warns against the danger of their being used by non-medical groups who may be primarily interested in supplying glasses, and stresses that all such programs should be under the supervision of ophthalmologists. Visual deficiencies found may represent intraocular disease, and the use of cycloplegic drops is essential for the satisfactory initial examination of children with ocular defects.

4. *Continued research and the application of the latest treatment methods for established cases* should be intensified. Effective treatment of early amblyopia consists of simple occlusion of the better eye together with the provision of glasses, if needed. Newer methods of treatment (pleoptics, euthyscopy) are still largely in the developmental stage, but for the first time are offering some hope for deeply established and neglected cases. In an area where no effective treatment previously existed, these revolutionary new techniques represent major advances. However, the percentage of cases helped is limited; visual restoration is generally only partial; and the treatments are expensive and time-consuming. Because of these limitations, development of the new approaches (exciting as they may be from the scientific point of view) should not distract us from earlier implementation of the simple proven methods of eliminating unilateral amblyopia. As Parks[12] points out, "With simple occlusion at an early age, plus mass visual screening of all children between 4 and 4½ years of age, there would result within one generation such a scant number of monocular amblyopes of the ex anopsia type that little need would prevail for these expensive and noble attempts to improve amblyopia at a later time of life."

JOHN C. LOCKE

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Editorial Comments

ABC ELECTROCARDIOGRAPHY: A "SIMPLIFIED" SYSTEM

Almost everybody interested in electrocardiography will agree that a simplification of present techniques would be highly desirable. An ideal method would require a minimum number of leads; would lead from fixed anatomical points, readily located by non-medical technicians; and, most important, would yield all possible information concerning the electrical activity of the heart.

The standard limb leads of Einthoven (Leads I, II and III) leave little to be desired with respect to ease of application of electrodes and complete reproducibility of technique. The electrodes may be attached anywhere along the appropriate arm or leg, without affecting the configuration of the recorded complexes, in contrast to leads whose electrodes are applied to the torso. However, since they record electrical phenomena only in the frontal plane, there is obviously a large component of the heart's electrical field to which they give no expression. By combining the frontal plane leads of Einthoven with six precordial "unipolar" leads in the horizontal plane, Wilson developed a sys-

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tem which yields a great deal more information concerning the heart's total electrical activity but which is time-consuming in large-scale application and contains a number of lead-points on the precordium which are difficult to locate with precise accuracy in serial recordings.

In an effort to improve on these methods, E. R. Trethewie of the University of Melbourne has developed a technique which he calls "simplified" ABC electrocardiography. He employs only three bipolar leads, which he labels A, B and C. A is a vertical lead with electrodes attached to the manubrium sterni (M) and to the xiphisternum (X). B is a horizontal lead with electrodes attached to the xiphisternum (X) and to the left mid-axilla (L). C is an antero-posterior lead with electrodes at the right infra-scapular region of the back (R) and at the xiphisternum (X). Thus all three leads have a common origin at the xiphisternum, and are at right angles to each other.

This provides a tri-dimensional system theoretically capable of recording the resultant values of all electrical forces produced in the heart, and Trethewie claims that it will detect all changes shown by the currently popular 12-lead system and, in addition, changes not demonstrated by these leads. His theoretical argument is persuasive, but as far as can be learned from tracings reproduced in his publications, he appears to accept as conclusive evidence of infarction ST and T-wave changes that most authorities would consider to have non-specific significance only. Moreover, his horizontal-plane leads B and C correspond closely to leads V_2 and V_6, and it is common knowledge that many small infarcts that can be detected in leads V_3, V_4 or V_5 may not produce diagnostic changes in either V_2 or V_6, and hence would not be expected to produce such changes in leads B or C. This is a serious objection on grounds of accuracy.

There are disadvantages also with respect to ease and rapidity of electrode application. Of Trethewie's four electrode positions, only two—the manubrium and xiphisternum—are easily located anatomical landmarks. The remaining two positions—the base of the right chest and the left axilla—are vaguely defined and would have to be laboriously pinpointed by calipers with reference to fixed bony landmarks for precise scientific work. Otherwise comparison of serial records is not possible. The same objection can be raised against the six precordial leads now in vogue, and of course it is a valid one; but it applies with greater force when only two sites are being explored than when six are, since the six closely adjacent leads tend to reveal any accidental shift in electrode position by the gradual change in configuration of the complexes from one lead to the next.

There is yet another serious disadvantage in the practical application of the method owing to the necessity of attaching the electrode (R) to the back, which would be very difficult for an unassisted technician working on a seriously ill patient.

In summary, one cannot see on theoretical grounds how these leads might be expected to carry out the author's claim that they yield information not available in conventional leads, nor are the concrete examples cited in his writings convincing on this point. Moreover, although fewer leads are used, the system is far from simplified in the sense of facilitating the application of electrodes or providing leads that can be more accurately reproduced in serial records. At the present time, no system of scalar electrocardiography has been described that affords a more comprehensive display of the heart's electrical activity than the combination of Einthoven's limb leads and Wilson's six precordial V-leads. However, it is possible that in a very large-scale project such as the examination of army recruits it might seem desirable to make use of some more rapid screening method, accepting the risk of overlooking a small percentage of abnormalities. In such a case, one would scarcely be attracted to the ABC system with its cumbersome electrode attachment which would slow down the technician, and its unfamiliar ventricular complexes which would require retraining of the interpreting physician. It would be much simpler and at least equally accurate to use leads already in common use, those most frequently recommended for this purpose being lead I for horizontal forces, AVF for vertical forces and V_2 for anteroposterior forces. The limitations of such a short-cut are freely admitted, but they are probably no greater than those inherent in the ABC system, whereas the advantages over the latter in speed of recording and ease of interpretation would be considerable.

BLOOD GROUP ANTIGENS AND GASTRO-INTESTINAL DISEASE

One of the few recent developments in relation to the etiology of peptic ulcer has been its correlation with blood groups. The original demonstration by Aird *et al.* in 1953 of the correlation between gastric cancer and blood group A was soon followed by surveys by C. A. Clarke and his colleagues and by others showing that persons of group A and of group B were less liable to peptic ulcer than those of group O.

Blood group substances are mucopolysaccharides and are distinguished from each other by their antigenic properties. People who belong to group O have a mucopolysaccharide, called H substance, which appears to be present to a much lesser extent in people of other blood groups. These substances are present in body tissues and fluids and are excreted into the saliva and gastric juice. Clarke and his colleagues have been investigating the association between blood group ABH secretion on the one hand and the incidence of duodenal or gastric ulcer on the other. In a recent paper[1] they present evidence of a striking association between ABH non-secretion and duodenal ulcer which was however not present in their cases of gastric ulcer.

From a table compiled for Clarke by Doll it can be seen that persons of blood group O who are non-secretors of ABH substances have a far greater risk of developing duodenal ulcer (2.49:1) than persons of group A, B and AB who are ABH secretors. They found little difference between the mean salivary titre of A, B and H substances in secretors with duodenal ulcers and their unaffected sibs. The total concentration of these sub-

stances present in the saliva of healthy persons is almost independent of blood group and of secretor status. Clarke and his colleagues suggest with good reason that if the association between group O, non-secretion and duodenal ulcer is causal, the most probable explanation will be a difference between antigenic properties of these substances, which in turn implies that there is an immunological factor in the pathogenesis of duodenal ulcer.

In this connection the report by Barber and Dunsford[2] of a patient dying with carcinoma of the stomach who was found to have an excess of blood group substance A in her serum is of some interest. This patient was also found to have an excess of H substance in her serum, and although it might well be that this excess of both substances was caused by the terminal cancer, the possibility exists that this excess was in itself the cause of cancer of the stomach. Bockus[3] has often expressed the belief that duodenal ulcer seems to confer a great degree of immunity against gastric cancer. Malignant gastric ulcer in the presence of duodenal ulcer is rather infrequent. It would be interesting to speculate on this apparent incompatibility of the two diseases in the light of the findings regarding blood group relationships. In view of the very slow progress in the elucidation of etiology of peptic ulcer, the present work on blood group substances is a most heartening development.

The apparent difference in behaviour of gastric and duodenal ulcer in relation to blood groups and secretor status as shown by Clarke and his colleagues seems yet another proof that gastric and duodenal ulcer are two separate diseases not necessarily related etiologically. Jones[4] has presented some other very striking statistical evidence for these differences based on the social class pattern and on hereditary behaviour. Another finding apparently specific to duodenal ulcer patients is that hypersecretion is due not to increased activity of individual gastric cells but to a greater secretory cell mass, and this may well be hereditary.

W. GROBIN

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EXERCISE AND HEART DISEASE: A STUDY IN REGIONAL CIRCULATION

In preliminary investigations the response to exercise in normal subjects was studied by Donald (*Brit. M. J.*, 1: 985, 1959) under the same conditions as in patients with heart disease. The oxygen uptake was measured on normal subjects who were exercised at different levels with oxygen uptakes corresponding to those while walking on the flat at 1½, 2, 3 and 5 miles per hour. It was found that an almost steady uptake of oxygen was reached within one minute, and in the same time mixed venous blood saturation also achieved a steady level. It was possible to demonstrate that the cardiac output, which rose very rapidly and remained almost constant during five minutes' exercise, returned to a steady resting value within one minute. In patients with mitral stenosis studied in a similar fashion the mixed venous blood saturation fell to a much lower level than in normal subjects, and there was a greater delay in achievement of a steady level of mixed venous blood saturation and of a maximum oxygen uptake.

With the cardiac catheter moved into position so that its tip lay well in the major vein draining a limb or organ under consideration, samples of venous blood were taken before and after exercise in order to determine the regional blood flow. In normal subjects it was found that exercise causes a transient reduction in blood flow through the skin of hand and arm, but this soon passes off and the skin blood flow increases considerably in order to allow increased heat loss. In the severely disabled cardiac patient skin blood flow was reduced still further on exercise in order to inhibit the skin vasodilatation which normally occurs after exercise. In patients with heart disease and restricted cardiac output, the forearm muscle blood flow is relatively normal during rest but is reduced after leg exercise. When splanchnic circulation was similarly studied it was found that normal subjects showed no significant increase in hepatic arteriovenous oxygen content (A-V) difference until fairly strenuous exercise was carried out. There was an apparent decrease in blood flow through the splanchnic area after exercise, which suggests that the splanchnic circulation is reduced in order to permit increased blood flow through the skin and the recently exercised muscles. In patients with heart disease the author's calculations show that exercise reduced the mean splanchnic blood flow to one-quarter of its pre-exercise value. The depression of hepatic venous oxygen saturation could be shown to continue for 10 and even 20 minutes after exercise. Renal blood flow was similarly reduced after exercise in the normal, but even much more in the cardiac patient. Cerebral blood flow in patients with heart disease was slightly reduced at rest, but as in normal subjects there was no important change during exercise. At a given level of leg exercise, the femoral A-V difference was much greater in patients with restricted cardiac output than in normal subjects. In some of the most disabled patients, femoral venous blood in a number of instances was found to contain no oxygen whatsoever after exercise and yet these patients did not complain of any undue weakness or discomfort in their legs. In the patients with heart disease the mean blood flow dropped from 4.1 litres a minute in the second minute to 3.9 l./min. in the fifth minute against an increase in the normal subjects from 5.0 l./min. in the second minute to 6.6 l./min. in the fifth minute of exercise.

The author concludes that even grossly disabled patients have very efficient circulatory adjustments, achieved by a considerable reduction in blood flow to the whole skin, to muscles not involved in the exercise, to the splanchnic area and to the kidneys. These findings indicate that there is a possible danger of repeated hepatic and renal ischæmia in cardiac patients during exertion. In the author's opinion the coronary blood flow, which is about 5% of the cardiac output, is also maintained at satisfactory levels in patients with mitral stenosis.

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Medical News in brief

THE TREATMENT OF BARBITURATE INTOXICATION

The management of barbiturate intoxication has passed through various phases in the last couple of decades during which different methods of treatment have been advocated. In its present stage and now that bemigride has been shown to be another stimulant of the central nervous system rather than the specific antagonist of barbiturates it was once thought to be, general supporting measures form the only type of therapy which has withstood the advances in pharmacology and physiology. These measures include the maintenance of proper oxygenation of tissues through a patent airway and functioning lungs; they entail the control of pulmonary infection arising either from stasis or aspiration. They are also directed at counteracting shock through judicious use of vasopressors and adequate fluid replacement. Elimination of the toxic substance may be accelerated through sustained diuresis, and some authors have even gone so far as to recommend the use of the artificial kidney to promote a faster elimination of the barbiturate through dialysis.

A recent contribution to this field by Mollaret, Rapin, Pocidalo and Monsallier is worthy of notice. It is based on experimental work carried out on dogs, and deals with the variations in ionic dissociation of phenobarbital associated with variations in environmental pH. Phenobarbital is a weak acid whose degree of ionization is strongly influenced by the local pH. Its molecular ionic dissociation is greater in an alkaline medium. On the other hand the degree of permeability of the cellular membrane to weak acids varies considerably, depending on whether or not they are dissociated. The total molecule will cross the cellular membrane much more readily than its ionized components. Alkalinization therefore reduces the penetration of phenobarbital in cells.

This was borne out by the rise in level of blood barbiturate in bilaterally nephrectomized dogs given phenobarbital and subsequently perfused with a solution of sodium bicarbonate. This was interpreted as reflecting a rise in extracellular barbiturate concentration from a migration of the phenobarbital out of the cells. In another set of animal experiments, dogs were intoxicated with phenobarbital and subsequently perfused with large amounts of hypertonic sodium bicarbonate. The urinary excretion of barbiturate was found to rise in proportion to the degree of alkalinity of the urine—up to a point. In testing the various means of alkalinizing the animals, it was found that hypertonic sodium bicarbonate solutions alone are more effective than acetazolamide or than their combined use.

These experimental data have received a clinical application in 93 cases of barbiturate intoxication. All these patients received large quantities of hypertonic $NaHCO_3$ intravenously, usually in concentrations of 14%. In selected cases where an endotracheal tube or a tracheotomy cannula had been installed, concentrations of 30% were used in association with controlled breathing, raising the arterial pH to 7.60. The results have been uniformly satisfactory and the average duration of the coma has been substantially reduced.

This refinement is not meant to replace the fundamental supportive measures mentioned above, nor can it be applied in all circumstances, as such a fluid load calls for intact renal and cardiac functions. The potassium level must be closely watched since a prolonged diuresis will undoubtedly bring about a state of hypokalæmia unless the losses are made good by replacement. Finally, the authors warn against any rise of arterial pH above 7.60. This implies the carrying out of several plasma pH determinations per day.—*Presse méd.*, 36: 1435, 1959.

CLASSIFICATION OF THE CAUSES OF DIABETES INSIPIDUS

On the basis of their experience with more than 100 cases of diabetes insipidus, Randall, Clark and Bahn (*Proc. Staff Meet. Mayo Clin.*, 34: 299, 1959) distinguish two major groups: primary and secondary diabetes insipidus. In primary diabetes insipidus there is a familial form which frequently begins in infancy or childhood. Idiopathic diabetes insipidus may appear at any age and in either sex but it is unusual for it to begin in infancy. Although in a few cases of the familial and idiopathic forms a decrease in the number of nerve cells in the supraoptic and paraventricular nuclei was found, it is not known what the cause of these changes is or whether such changes are to be found in all patients with primary diabetes insipidus. Secondary diabetes insipidus is discussed under the headings of trauma, neoplasm (primary or metastatic), vascular disease, infectious disease and systemic disease. It should be remembered that in many instances when the condition is diagnosed as primary diabetes insipidus it is actually a manifestation of some underlying disease. Two cases are briefly presented to illustrate the point that many years' follow-up may uncover an underlying cause for an apparently primary diabetes insipidus.

RESCUE BREATHING

Rescue breathing is the name given by Ruben and his colleagues (*Lancet*, 2: 69, 1959) to the method of artificial respiration in which the rescuer repeatedly applies his mouth to the victim's mouth or nose and exhales. Studies of this method have, however, shown that it often fails in efficacy because laymen applying the method fail to obtain and maintain the necessary free airway. They either let the jaw fall back or fail to hold it properly.

Ruben and his colleagues suggest as an alternative that the victim be placed on his back with the head fully extended, by use of one hand on top of the head and the other below the neck to assist tilting. The rescuer can then apply mouth-to-mouth respiration with good effect. Trial of the new method by 28 laymen on anæsthetized patients with recording pneumography to assess efficiency showed that it was easy to teach and to perform; later studies on 300 unconscious patients showed that only in three cases was extension of the head insufficient to ensure an open airway.

(Continued on advertising page 62)

REVIEW ARTICLE

PHYSIOLOGICAL HAZARDS OF MICROWAVE RADIATION: A SURVEY OF PUBLISHED LITERATURE*

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POWERFUL MICROWAVE GENERATORS, of the type used in present-day radar and television transmitters, and the much more powerful generators envisioned in the near future, generate several types of radiation which offer potential hazards to the life or health of personnel concerned with their operation. These radiations include not only the microwaves themselves, but also x-rays and small amounts of ultraviolet radiation. The biological hazards offered by the latter types of radiation are well known and well appreciated. Protection against these dangerous radiations is essentially a matter of good engineering in the design, construction and location of the units. The nature and extent of the possible hazard offered by microwaves themselves have been much less clearly established. Because of the increasing use of microwaves, and the steadily greater powers employed, it is essential to establish whether or not a health hazard exists, and what the nature and magnitude of any such hazard may be. The following remarks are concerned with this problem, and represent the conclusion reached on the basis of a survey of experimental and clinical observations published to date.

PRESENT EXTENT OF HAZARD

The development of more recent high-output microwave apparatus has been accompanied by a highly commendable display of caution on the part of the authorities concerned. This has resulted in the relatively unusual situation in which a great deal of research has been devoted to the study of possible hazards before any proven mishaps have occurred. Two case reports have appeared in the medical literature, describing lesions occurring in patients exposed to radar waves. One report[25] describes a case of bilateral cataract in a man working with a small microwave generator similar to those used for diathermy purposes. The lesions described are quite unlike those produced by microwaves in all the experimental studies, and the authors are careful not to claim that the lesions were caused by microwaves, but merely to urge caution. The second case[33] is that of a man dying of diffuse peritonitis and appendiceal abscess, following a one-minute exposure at unstated distance to the beam of a naval radar unit of unknown power. The lesions are in no way characteristic of microwave exposure, and it seems virtually certain that an exposure of sufficient intensity to cause such lesions would have killed the patient rapidly through hyperpyrexia. Neither of the two case reports gives sufficient information to permit even a guess concerning the actual intensity of exposure, and it seems improbable in the extreme that the lesions described were in fact caused by microwaves.

On the contrary, careful long-range medical observations on large groups of personnel working with radar have revealed no evidence whatever of acute or chronic damage resulting from their occupational exposure to radar waves.[1, 2, 13]

The numerous experiments with animals undertaken so far, however, show clearly that damage due to tissue heating by microwaves can most certainly occur. The level of microwave power required to produce such injuries, as will be discussed below, is seldom if ever encountered in normal operational use of present-day radar equipment, but the large increases in the power of radar apparatus which are contemplated in the very near future make it probable that serious health hazards to radar personnel will indeed arise. Therefore, the present concern with physiological injury produced by microwaves is a precautionary one, designed to anticipate and avoid future danger, through an understanding of the means by which injury is produced, and a satisfactory definition of the safe limits of exposure of personnel to microwaves.

PHYSICAL CHARACTERISTICS OF MICROWAVES AND THEIR TRANSMISSION

It is beyond the scope of this review to undertake any detailed consideration of the physics of microwaves. The following remarks are intended only to summarize those features of microwaves which are relevant to a discussion of physiological hazard.

Microwaves are electromagnetic radiations, intermediate in wavelength and frequency between the longer portion of the infra-red and the short or high frequency radio-waves. The exact differentiation between so-called UHF, or ultra high frequency radio-waves, and microwaves is a matter of definition and usage. According to current usage, microwaves are those ranging from 1 mm. to 30 cm. in wave length.[11] Various wave bands used in radar, in long-distance telephony and in television signal relay are included in the microwave group. However, the bands of interest with respect to physiological hazards are those lying between 100 cm. and 1 cm. wave length. Since all electromagnetic waves have a velocity of 3×10^{10} cm. per second, these wave lengths correspond to frequencies of 300 to 30,000 megacycles per second (Mc/sec.) respectively. While the 300 Mc waves are not microwaves according to present electronic usage, in the present paper they will be considered

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together with microwaves, with respect to physiological hazards.

The average power, the duty cycle, and the spatial distribution of energy may vary greatly, depending upon the individual characteristics of the microwave generator. For example, existing units range from 100 to 1000 watts output, but by engineering modifications quite within the range of present knowledge, it is anticipated that 20 to 30 kilowatt outputs are quite feasible, while future developments may make possible powers greatly exceeding even these values.[37, 49] The duty cycle may also be varied between very wide limits. For example, for radar use it is desirable to operate the generator in very short bursts of high intensity, allowing sufficient time between bursts for the impulses to reach their target and be reflected to the observing post without causing interference with the following impulses. The duty cycle refers to the interval between the commencement of one burst of power and the commencement of the next burst. Thus, a 0.1% duty cycle would mean that a very short burst of power would be followed by a silent interval 99.9 times as long, followed by a second short burst of power and another long silent interval, and so on. Most radar sets operate on such short duty cycles. Using the illustration given above, a peak power output of 5 megawatts during each burst of power would correspond to an average power output of only 5 kilowatts through the full cycle. For television transmission purposes, the time or duty cycle is usually 100%. Under these circumstances the peak power output and the average power output are identical.

From the generator the microwave output is usually conducted along a wave guide, which is a hollow metal channel, of rectangular cross-sectional shape and dimensions such that reflection and distortion of the wave pattern are minimized. The wave guide terminates in a funnel or horn which delivers the radiation to an antenna from which the microwaves are dispersed into the atmosphere. In television broadcasting, it is usually desired to distribute the radiation widely over a very large target area, so that an essentially non-focusing type of antenna with little or no gain in power density* is used. For most applications of microwaves, such as radar and communication relay, it is usually desirable to focus the radiation emitted from the funnel of the wave guide into a compact beam, for more effective transmission to a selected target over a long distance. Since the optical behaviour of microwaves, particularly those of very short wave length, resembles that of visible light, a reflecting antenna of parabolic or other suitable shape is used in such units for the purpose of focusing the microwaves into a narrow beam, with consequent gains of 600 to 1000-fold in power density. This ability to be concentrated into an intense beam is one of the factors giving rise to the special hazards of microwaves. The beams, however, are always somewhat divergent rather than completely parallel, so that the power density tends to decrease as the square of the distance from the virtual focal point, in a manner analogous to the behaviour of focused light.

When microwave radiation reaches a target, it may be reflected from the surface, penetrate and be absorbed by the target, pass completely through the target and beyond, or show some combination of all of these forms of behaviour. The proportions of the incident energy which are reflected, absorbed, or transmitted unchanged, will depend upon many factors including the wave length of the microwaves, the texture and spatial orientation of the target surface, the composition of the target, and its thickness. When the target is a human being or experimental animal, the problem is considerably complicated by the inhomogeneity of the target. Thus, the presence or absence of fur, hair or clothing, the thickness and texture of the skin, the thickness and water content of the subcutaneous fat, the thickness and orientation of the various planes of deep fascia, all have a marked influence upon the absorption and conversion of microwave energy within the body. Schwan and his collaborators[44-47] have calculated on theoretical grounds the curves of energy absorption at various depths below the skin surface, for microwave radiation of different wave lengths, in subjects with much or little subcutaneous fat, when the incident energy is assumed to be delivered at right angles to the skin surface. They have demonstrated mathematically that under these conditions the proportion of energy absorbed is approximately 40% for frequencies below 1000 Mc/sec. or above 3000 Mc/sec. In the frequency range of 1000 to 3000 Mc/sec., the percentage of absorbed energy varies from 20 to 100%, depending upon the factors mentioned previously.

The depth distribution of the absorbed energy within the body also varies greatly. Radiation of a frequency greater than 3000 Mc/sec. behaves essentially like infra-red radiation, being practically all absorbed within the thickness of the skin itself. With frequencies below 500 Mc/sec., the radiation penetrates deeply and absorption occurs diffusely within the body. At frequencies between these two values, the distribution varies markedly from one individual to another depending upon the factors of tissue structure mentioned above.

In summary, it may be stated that the great number of variables involved in microwave generation, focusing, air transmission, and absorption characteristics of the target, make it impossible to predict from the initial power output of the apparatus what the final result will be in terms of energy absorbed by the exposed subject. Each case must be assessed individually, and it is apparent that the range of variation is enormous.

*Power density is used throughout this report to mean the rate of delivery of energy to a unit area normal to the direction of propagation. "Flux" is an adequate alternative term.

MECHANISMS OF MICROWAVE ENERGY CONVERSION IN THE TISSUES

Probably because of the wide interest in ionizing radiation, and because of the fact that the continuous spectrum of electromagnetic radiations includes x-rays and gamma rays, there has been a certain measure of confusion in some quarters with respect to the results of absorption of microwaves. It should be pointed out that chemical activation, in the sense of ionization or free radical formation, such as that induced by ultraviolet rays, x-rays, or gamma rays, does not occur as a result of microwave irradiation. Although it is still convenient for many purposes to talk of the electromagnetic radiations in terms of waves and wave lengths, their photochemical effects can only be grasped in terms of modern physics, according to which these radiations are described as consisting of individual quanta, or discrete bundles of energy, travelling at the speed of light. The energy value per quantum is characteristic of each type of radiation, and is inversely related to the wave length, e.g. one quantum of ultraviolet radiation of 2536 A° wave length has 400,000 times as much energy as one quantum of 10 cm. microwave radiation. A given molecule will only absorb those radiations of which one quantum corresponds exactly to the energy requirement for some change in state which the molecule can undergo. A crude but useful analogy might be to compare quanta of different types of radiation to coins of different values, and a complex molecule to a vending machine. If a vending machine be imagined, which dispenses only cigarettes in response to a twenty-five cent piece, and only matches for a one cent piece, then the deposit of 25 one cent coins will produce only 25 packages of matches, and not cigarettes. In this analogy, we may substitute the effects of various changes of energy state in the molecule for the various products dispensed, and ionization can be compared to the cigarettes, one quantum of x-rays to a twenty-five cent piece, and one quantum of microwaves to one cent. In other words, the energy value of one quantum of microwaves is much too low to produce the type of excitation necessary for ionization, no matter how many quanta are absorbed. Chemical activations involving orbital transitions of electrons are rarely encountered with radiation of wave length longer than that of ultraviolet, or possibly visible light (photosynthesis). Even the much smaller transitions in energy level associated with alteration of inter-atomic bonds within a molecule (those giving rise to the so-called vibrational and rotational spectra) are too large to be produced by quanta of microwaves. These changes are characteristically associated with infra-red radiation.

The only transitions between energy levels that can be effected by microwaves are the extremely small transitions associated with changes in magnetic orientation of an atom or molecule. Ordinarily, within the permanent magnetic field provided by the earth, the energy requirements for these orientational transitions are so low that they are met by very long wave electromagnetic radiation. If a strong external magnetic field is applied, however, the energy requirement for these small transitions is increased. This fact is used to advantage in the study of the internal magnetic fields of various molecules. By applying an extremely strong external magnetic field, the energy requirement for these small orientational transitions is made to coincide with the quantal energy values of microwaves. This forms the basis for the procedure known as paramagnetic resonance analysis.[3] It should be noted that this is not an effect of microwave irradiation, except under the artificial condition resulting from a simultaneous application of an extremely strong magnetic field.

Certain interesting magnetic orientation effects of microwaves can be demonstrated with biological materials *in vitro*. One of these effects is known as pearl chain formation.[21, 22, 44] When suspensions of oil globules in water, or of erythrocytes or lymphocytes in saline, are exposed to very low power microwaves, the globules or cells line up in chains resembling strings of pearls, oriented along the lines of force of the magnetic field. The chains are readily broken up by mechanical agitation, by increased Brownian movement resulting from heat, or by switching off the microwave field. A second orientational phenomenon of possible interest is that known as dielectric saturation.[44] This is observed when solutions of proteins or other macromolecular substances are exposed to microwave fields of moderately strong intensity. All of the ionizable side chains of such molecules also tend to become oriented along the lines of the magnetic field, tending to break hydrogen bonding or other secondary inter- or intra-molecular linkages, and altering the zone of hydration on which the solubility of the molecules depends. This may lead to non-thermal denaturation or precipitation of the molecule.

By far the most important effect of microwave absorption, however, is the conversion of the absorbed energy into heat. All the radiant energy absorbed is ultimately transformed into increased kinetic energy of the absorbing molecules, which, by increased collision with adjacent molecules, produce a general heating of the entire medium. However, this dissipation of heat throughout the whole mass of the target requires a finite time, and it is clear that within the tissues of an irradiated subject there may exist considerable local differences in temperature during the time of exposure. These differences depend chiefly upon the differences in water content of the various tissues, and upon the presence or absence of interfaces capable of reflecting the microwave radiation. Thus, heat generation is greatest in those tissues with a high content of water, and is also enhanced locally in the areas adjacent to bone or tough fascial planes

which act as reflecting surfaces.[23] This will be considered further in relation to the problem of tissue damage.

EXPERIMENTAL LESIONS PRODUCED BY MICROWAVES

The fact that microwaves of appropriate frequencies can generate heat deep within the tissues has been known for over a decade and forms the basis for the clinical use of microwave diathermy treatment.[4, 12, 23, 43] It also underlies the development of rapid cooking apparatus using microwave generators. It is evident that the rise of temperature in an irradiated body or tissue will depend upon the amount of energy absorbed and converted to heat, minus the amount of heat dissipated by conduction, radiation, or other means. In the case of a single organ or tissue subjected to localized microwave radiation, the dissipation of heat is dependent chiefly upon the magnitude of blood flow through the part, the circulating blood serving as a cooling system. Thus, temperature rise resulting from moderate irradiation of the normal human arm or leg is self-limited, in that the temperature rise which reaches a maximum in 10 to 20 minutes is then reversed by a marked local increase in blood flow.[23] In relatively ischæmic tissues, such as the eye or the testis, dissipation of heat is effected essentially by conduction to the surface. This is a relatively inefficient mechanism, and continued irradiation can result in sustained local temperature rises of as much as 10 to 20° C.[9, 17, 19, 52]

The production of characteristic lesions in irradiated organs is found to parallel the production of such temperature rises. In the eye, the characteristic lesion is a small, irregular or punctate subcapsular opacity, at the posterior pole of the lens, appearing after a latent period of two to 14 days following exposure to microwaves. Unless the exposure has been so severe as to cause an intense acute inflammatory reaction in the eye, the opacities usually begin to regress after a while, and within a few weeks disappear completely or leave small punctate scars.[14-16, 38, 51, 52] It has been shown[17] that adenosine triphosphatase and pyrophosphatase in homogenates of lens tissue are very easily destroyed by temperatures of the order of those found in microwave-irradiated eyes. However, no loss of activity of these enzymes was found in eyes with small localized posterior cataracts, so that the mechanism of cataract formation must be dependent upon some other damage not as yet known.

The characteristic lesion found in the testis is a degeneration of the epithelium lining the seminiferous tubules, and a sharp reduction in the numbers of maturing spermatocytes in the lumen.[9, 19, 26, 37] There is a patchy irregular distribution of damage within the testis, adjacent tubules often showing markedly different degrees of degeneration. The damage is indistinguishable in character from that produced by the external application of heat to the testis, and is almost certainly fully reversible, as is the latter except in severe cases.

When the whole body is subjected to microwave irradiation, the radiation absorbed is converted to heat, and must be dissipated by the various means at the disposal of the body, including radiation, conduction, and evaporation of sweat. When these protective measures are insufficient to dissipate the heat as rapidly as it is developed, the circulation of the blood serves to spread the heat from the irradiated portions diffusely throughout the body, resulting in a rise in general body temperature. The magnitude of this rise will of course depend upon the degree of imbalance between heat production and heat loss. If the rise of temperature is excessive, the damage produced is indistinguishable from that due to fever of any origin.[5, 18, 20, 23, 36] During the rise in temperature, reactions indicative of a nonspecific pituitary-adrenal response to stress occur, including a sharp decrease in eosinophils and lymphocytes, and a rise in leukocytes. Severe hyperpyrexia carried to the point of death results in diffuse degenerative lesions throughout the body, including renal tubular degeneration, myocardial degeneration and necrosis, hæmorrhagic lesions in the gut, respiratory tract and liver, and diffuse hæmorrhagic and degenerative lesions in the Purkinje cells, cerebral cortical neurons, and other brain structures. Fatally exposed animals develop acidosis, hyperpnœa, lacrimation and tetany, and finally die of respiratory arrest.

A variety of other effects of localized or whole body microwave irradiation have been investigated by American and European workers. Very intense microwave fields of up to 10 watts per sq. cm. applied directly to the head have been shown to cause deterioration of conditioned reflex activity in dogs.[32] This is hardly a surprising finding, and adds little to our knowledge since no measurement of cerebral temperature change was made, and no pathological studies of brain damage are quoted. Whole body irradiation with a 130 watt radar apparatus producing 15 cm. radiation was found to have no effect upon blood pressure and circulation time[39] or myocardial function.[40] Whole body irradiation of near-lethal intensity was reported to cause a decrease in blood glutathione,[42] while *in vitro* irradiation of serum caused no specific alteration in serum lipase or amylase activity.[41] These studies are virtually useless for the purposes of the present survey, since they give no details of power density, body temperature of the animals, or other indices of the severity of exposure. Another group of workers[35] has studied the effects of 3 cm. and 10 cm. microwaves upon body growth, plasma volume, and tissue plasma content in exposed mice. The findings are taken to suggest highly specific non-thermal effects of various wave lengths upon these parameters of mouse growth. However, no statistical assessment of the significance of the

findings is presented, and the controls do not include animals exposed to environmental heat at levels which they can tolerate without rise in body temperature. The results therefore add little to the understanding of the mechanism of microwave effect.

BIOLOGICAL SIGNIFICANCE OF NON-THERMAL EFFECTS OF MICROWAVES

As mentioned previously, certain magnetic orientation effects of microwaves can be demonstrated *in vitro*. Pearl chain formation can be shown with erythrocytes and lymphocytes, but it seems extremely doubtful that this phenomenon can have much biological significance in large animals, including man. Mechanical agitation such as the circulation of blood, and thermal agitation resulting from strong microwave irradiation, tend to break up the chains. Therefore, the phenomenon is usually observed with microwave fields much too low to cause any recognizable biological damage. The phenomenon of dielectric saturation, mentioned above, may possibly apply to proteins within living tissue, because this process can be observed with field strengths known to cause lesions in experimental animals. To date, however, there is only one piece of evidence which may suggest such an effect in living animals as a contributory factor in the production of lesions. This evidence[8] consists of the finding that pulsed radar waves with a high peak power are more effective in producing cataracts in the rabbit's eye than continuous output of the same average power. Thus, a single 20 minute exposure to 12 cm. pulsed radar waves on a 50% duty cycle, with a peak power of 0.28 watt per sq. cm. (equivalent to continuous power of 0.14 watt per sq. cm.) produced opacities in 8 out of 12 rabbits, while a 20 minute exposure to continuous power of 0.14 watt per square cm. did not produce opacities. The thermal effect is a function of the average power only. This finding, therefore, raises the possibility that non-thermal denaturation of protein in the lens, which may well be related to the peak power, might be an auxiliary factor in the production of lesions in at least some tissues.

It has been claimed that direct irradiation by microwaves is capable of producing non-thermal damage in developing teleostean ova,[34] as shown by a higher percentage of developmental anomalies in ova exposed to radar than in control ova heated to the same temperature as that measured in the irradiated medium. Similar claims have been made for non-thermal sterilization of bacterial cultures by radar fields (see 7 for references). However, extremely careful and thorough experiments with cultures of *E. coli* and other bacteria, exposed to various radar fields of up to 600 megacycles in frequency and 100 kilowatts peak power, led to the conclusion that the only bactericidal effect is thermal.[7] The latter authors point out the great difficulties in accurate temperature measurement by non-experts.

A recent report[21] describes certain morphological changes in the nuclei and chromosomes of cells in garlic root-tips growing in water, when exposed for five minutes to 27 Mc/sec. radiation of unstated power, operating on a duty cycle of .004 to .009. These effects are again described as non-thermal, though no description is given of the method of measuring the temperature. This is a particularly important omission in the work cited, since the electrodes were separated by a distance of only a few millimetres, much of which was occupied by glass insulation. The volume of water must have been very small indeed, and the cooling relatively rapid on termination of radiation exposure. Under such conditions, accurate measurement of temperature change within the root-tips must be an extremely difficult technical problem. In the absence of definite information, it would be well to reserve judgment on the question of whether or not the observed changes are truly non-thermal.

Another interesting report of non-thermal effects of microwaves, unfortunately not well documented,[30] concerns the production of temporary motor paralysis in small animals on exposure to low-power microwaves. The immediate disappearance of paralysis on termination of radiation suggested that the symptoms may have resulted from interference with the electrical phenomena of nerve impulse conduction by resonance with the microwave field. Such resonance, if true, would be critically dependent upon the wave length of the microwaves, and the dimensions of the nerve structures of the animal.

In summary, though non-thermal effects may conceivably contribute to the development of lesions in subjects exposed to microwave irradiation, by far the most important factor is the production of heat through microwave absorption with consequent effects of either local tissue damage by heat, or hyperpyrexia in the whole organism.

QUANTITATIVE ASPECTS OF MICROWAVE HAZARD

One of the most pressing concerns of both military and civilian authorities with respect to biological effects of microwaves is the establishment of safe limits of exposure of personnel in the course of duty. It has been pointed out in the preceding sections, however, that the only meaningful criterion of exposure is the quantity of energy absorbed, and not the energy produced by the apparatus. It is extremely difficult to make a precise assessment of energy absorption under conditions normally encountered in radar operation. Certain experimental approaches provide a reasonably accurate measure of energy absorption. In one approach, the subject is exposed to microwaves within a wave guide or other closed space in which the pattern of cross-sectional energy distribu-

tion is known. From the area of profile of the subject, it is possible to make a reasonable calculation of the total energy absorbed. Such an arrangement bears almost no resemblance to the conditions of exposure under actual operation of radar installations. A second approach, which bears more resemblance to practical conditions, consists of irradiating the test object under free space conditions (e.g., in a room lined with completely absorbent material), and measuring the scatter of radiation in all directions from the test object. From such measurements, together with a measurement of the temperature increase in the test object, it is possible to compute the fraction of energy absorbed in the specimen. Both these methods fail to allow for the effects of air movement, humidity, and temperature, which influence greatly the heat loss by live subjects, especially man. However, they do permit an attempt to establish thresholds of exposure for the production of tissue lesions.

By such means, it has been established that a power density of 0.1 watt per sq. cm. applied directly to the eye can be tolerated for hours at a time with no production of cataract.[8, 10, 18, 19, 52] There is some disagreement concerning the lowest effective intensity. Carpenter[8] states that a 10 minute exposure at 0.28 watt per sq. cm. will cause opacities, while Williams *et al.*[52] state that a 90 minute exposure at 0.29 watt per sq. cm. is required to produce cataracts, and Ely *et al.*[19] state that an indefinite exposure at a density of 0.2 watt per sq. cm. does not cause any damage. All are agreed that with higher field strengths, cataracts can be produced by much shorter exposures. Williams *et al.*[52] demonstrated cataract formation with a single exposure of 5 minutes at 0.59 watt per sq. cm., 20 minutes at 0.40 watt per sq. cm., 40 minutes at 0.32 watt per sq. cm., and 90 minutes at 0.29 watt per sq. cm.

An important practical question is that concerning the possibility of cumulative damage resulting from repeated sub-threshold exposures. Conflicting opinions have been expressed concerning this problem, but the bulk of evidence does not support the concept of cumulative damage from sub-threshold exposures. All workers who have investigated simultaneously the intraocular temperature changes and the occurrence of lenticular damage on acute microwave irradiation, agree that there is a critical intraocular temperature which must be reached before opacities develop. This temperature, as reported by various authors, ranges from 45 to 55° C.[37] On termination of exposure, the temperature of the irradiated eye returns gradually to normal, and obviously no cumulative rise of temperature can occur if the intervals between exposures exceed the cooling time to normal temperature in the tissue or part concerned. The only cumulative effect to be anticipated, therefore, is the accumulation of damage resulting from repeated exposures, each of which is individually capable of producing some degree of damage, however slight. The problem may be somewhat confused by two factors. The first factor is the difficulty of accurate measurement of field strengths, as discussed in a previous section of this review. This may account for the rather large variations in threshold values for cataract production by single exposures, mentioned in the preceding paragraph. The second factor is the lag period of 2 to 14 or more days between the time of effective exposure and the appearance of lenticular opacity. This delay must correspond to a period of initial metabolic disturbance in the eye, directly caused by the microwave exposure, which gives rise to the subsequent morphological change. Since even the morphological changes are capable of regressing, it would be reasonable to expect that the functional damage, if not too severe, might regress without going on to form a visible lesion. The meaningful threshold value, then, should be that exposure which causes the initial biochemical lesion, rather than the obvious delayed morphological result. To date, however, it has not been possible to identify the basic biochemical lesion and so establish such a threshold value. This may be the reason why a few repeated exposures, each of which is very slightly below the single-exposure threshold for cataract production, can give rise to opacities [(8), and p. 243 of (37)], while a great many daily exposures to definitely sub-threshold power can be tolerated with no sign whatever of ocular damage [p. 193 of (37)].

Despite the disagreements mentioned above, there is on the whole fairly good agreement concerning the power densities and exposure times required to produce cataracts in animals as different in size as the rabbit and the dog. It is much more difficult, however, to define a maximum safe exposure limit with respect to the production of hyperthermia resulting from whole body irradiation. This greater variability is due to many factors. For example, the thickness and texture of the animal's fur and skin, the ratio of surface area to body mass, and the body size in relation to the wave length of radiation employed, all affect the efficiency of absorption of microwave energy and its conversion to heat. On the other hand, the mechanisms of thermo-regulation available to each species, and their efficiencies, will affect the degree of damage resulting from production of a given amount of heat within the body. In this respect, man is perhaps the best protected of all animals. Rabbits, for example, can tolerate an indefinite exposure to a power density of 0.01 watt per sq. cm. with no rise in temperature, but show a 1° C. rise with a flux of only 0.02 watt per sq. cm.,[45] and some deaths from hyperthermia occur in two hours at a power density of 0.03 watt per sq. cm., or in half an hour at 0.06 watt per sq. cm.[5, 10, 19] In contrast, human beings exposed to a flux of 0.22 watt per sq. cm. for 48 minutes showed a slight *fall* in rectal temperature, due to

the efficiency of the sweating mechanism in the dissipation of heat.[19]

Of the various tissues and organs examined, the testis appears to be the most sensitive in terms of the minimum exposure which can produce any recognizable lesion however small. Ely *et al.*,[19] studying dogs, rabbits and rats, attempted to estimate a safe limit of exposure in terms of the lowest power value required to cause *any* testicular damage in the most sensitive animal of the group. On this basis, an exposure of 0.01 watt per sq. cm. was considered the threshold for testicular damage, on an indefinite exposure. However, the authors point out that the damage observed with such low levels of exposure is extremely slight, almost certainly fully recoverable, and in no way differentiable from that due to such commonplace factors as, for example, a hot bath. They question, therefore, whether such damage should be legitimately considered a basis for appraisal of hazard from microwaves.

From the accumulated experimental observations, it becomes clear that each species differs from the rest in terms of relative sensitivity of different organs and tissues to microwave damage. It is therefore inaccurate to extrapolate to man on the basis of experimental observations on rats or rabbits. Moreover, as explained previously, these estimates of threshold values for production of lesions are based on experimental situations which in many cases do not resemble actual operational situations involving exposure to radar. Thus, such factors as environmental air temperature, humidity or wind strength have obvious significance with respect to the efficiency of thermo-regulatory mechanisms. For this reason, they have important effects upon the power absorption necessary to produce hyperthermia. Studies on cataract formation, in addition, have been mainly carried out by exposure of the eye directly to a microwave source at a distance of approximately one inch. Quite small variations in the distance of the eye from the source produce marked differences in the number and severity of lesions caused.[38] From a practical point of view, exposed individuals are hardly likely to be at exactly the same distance from a radar source on each exposure, and there is little value to a set of safety regulations which would have to stipulate separately for each radar generator the maximum safe exposure time at each of a series of distances varying by a few inches or feet. In addition, the fact of whole body exposure, by altering the body temperature, also alters the amount of exposure to the eye or testis required to raise the local temperatures in these organs to a point of damage.

In view of these difficulties, the only feasible method of establishing a maximum safe exposure limit is one which almost certainly errs widely on the side of safety. This method consists of taking the lowest exposure known to cause any sort of damage in the most sensitive animal, and allowing an additional factor of safety consisting of one or two orders of magnitude. Since most workers cited above agree that an indefinite exposure of 0.1 watt per sq. cm. will not cause hyperpyrexia or ocular damage in man, this figure forms the basis for presently established safety limits. Interestingly enough, this figure was also reached by Schwan[45, 46] on theoretical grounds, as the maximum safe value for indefinite exposure, on the assumption that a heat load, sufficient to double the surface dissipation of energy derived from metabolism, could be safely borne by a normal subject. The additional safety factor applied varies on the basis of personal preference rather than fact.[27] The United States Air Force employs a factor of 10, setting a maximum safe exposure at 0.01 watt per sq. cm. Others[50] recommend a safety factor of 100, suggesting a maximal direct exposure of 0.001 watt per sq. cm., on the basis that reflected energy must be taken into account, and that there is in fact no need for exposure during proper operation of radar apparatus.

Bearing in mind the actual circumstances associated with the use of radar or other microwave apparatus, it seems fairly clear that these maximum exposure limits are seldom if ever reached. Operating personnel have virtually no reason to be within the focal point of a radar antenna. Beyond the focal point the intensity falls off so rapidly that even with a 20 kilowatt transmitter, the power density 30 to 40 feet away is only 1/1000 of noonday solar radiation at the equator.[49]

A recent calculation[48] suggests that a 20 kilowatt transmitter distributing 35 cm. microwaves from a parabolic antenna of 10 m. diameter, mounted 10 m. above the ground and directed horizontally, would have a danger zone covering all the ground between 300 yards and half a mile in front of the antenna. However, this is based on an assumed maximum safe exposure of 0.01 watt per sq. cm., with an additional safety factor of 4. In the light of the experimental studies with human beings cited above, this assumed maximum appears to be considerably lower than necessary. There is therefore no real contradiction between these two statements,[48, 49] the difference being merely in the magnitude of the arbitrary safety factor used. Moreover, for most uses of radar, the transmitter is not fixed but constantly rotating, so that an exposed subject is only momentarily irradiated and then has the rest of the scanning cycle in which to dissipate absorbed energy before the beam again reaches him. Finally, most radar installations are aimed upwards rather than horizontally, for obvious reasons, so that operating personnel and others on the ground are likely to be exposed only to the very weak radiation at the margins of the beam, or scattered from distant reflecting surfaces.

FUTURE RESEARCH AND DEVELOPMENTS

The reassuring facts in the previous paragraph may not be valid for many more years.[27, 37] With future technical developments in radar, it is probable that extremely powerful transmitters with average outputs of up to 600 kilowatts will be employed in certain areas. Strategic considerations may require that the antennæ of these units be fixed in position, rather than in constant movement. This would mean that marginal scatter and reflection from fixed surfaces might well assume dangerous proportions. The nature of the danger, however, would not in any way differ from that which has been discussed in this survey. The problem would then be a practical one of at least two components. One component problem would be the development of a dose rate meter simulating tissues of a living organism, so as to measure not the power produced by the apparatus, but the probable power absorbed and converted to heat under any given set of circumstances. The Richardson dosimeter is a start in this direction, but it has not yet been perfected.[37] The second component problem would be the use of such a meter in mapping out the danger areas surrounding the radar installations. The solution of the problem would be essentially an engineering one, consisting of the provision of adequate shields and safeguards to keep operating personnel out of the recognized danger areas. Certain emergency maintenance duties may occasionally require personnel to work within known danger areas. For such purposes, a small, rugged, and easily read power density meter must be available for use within the danger areas, and suitable protective garments must be devised.

Basic research into the mechanisms of interaction of microwave energy and biological tissues[22, 28, 29, 44] is required, both for the most efficient and beneficial use of microwave therapy, and for the recognition of minimal degrees of physiological damage. However, practical protection of human beings against damage due to excessive microwave energy appears to require chiefly the application of common sense and sound engineering directed against known dangers, rather than a search for new and as yet unrecognized dangers.

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Men and Books

THE SECRETARIAL SUCCESSION IN THE CANADIAN MEDICAL ASSOCIATION

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A SENSE OF CONTINUITY has its own peculiar value for an organization which is approaching its 100th birthday. I therefore welcome the opportunity of presenting in retrospect the 13 individuals who have preceded me in the position of General Secretary of The Association. The review seems to me both interesting and instructive, and it is hoped that it will also appeal to the membership generally.

The organization of our Association in Quebec City in 1867 should be familiar to all Canadian doctors who have read Volume I of MacDermot's *History of The Canadian Medical Association*. In October of the year of Confederation there assembled in the Grand Hall of Laval University 160 doctors, representing the 3000 Canadian physicians of the day. Arrangements for the meeting had been undertaken by a committee of the Quebec Medical Society under the chairmanship of Dr. William Marsden, ably assisted by Dr. James A. Sewell and Dr. R. H. Russell, and when Dr. Sewell convened the session, he asked Dr. A. G. Belleau to act as secretary. In the first elections which followed the historic resolution, "That it is expedient for the medical profession of the Dominion of Canada to form a Medical Association, to be named The Canadian Medical Association", Dr. Charles Tupper was elected President and Dr. A. G. Belleau, General Secretary. The grandiloquent title General Secretary was apparently adopted to distinguish the incumbent from the Corresponding Secretaries from each of the four existing provinces.

Dr. Belleau had qualified five years earlier at Laval and McGill and was in his 28th year when the responsibilities of the infant organization were thrust upon him. Little evidence is available to indicate what must have been a busy year but Committees on Constitution and By-laws, Medical Education, Licensing and Medical Registration, Vital Statistics, Public Hygiene and Ethics had been appointed and their co-ordination must have taxed his secretarial resources. So great was the pressure of business that no scientific program was arranged for the First Annual Meeting in Montreal in 1868 but a familiar and prosaic secretarial duty is recorded, "Special railway and steamboat fares had been arranged by Dr. Belleau."

Although the first incumbent served only one year as General Secretary, he had a distinguished career as Secretary of the College of Physicians and Surgeons of Quebec from 1874 to 1898. It is recorded that Dr. Belleau inherited a considerable fortune from his uncle, Sir Narcisse F. Belleau, a former Lieutenant-Governor of Quebec, and his generous philanthropy was proverbial. He gave munificently to all charitable appeals and "In his capacity as Secretary of the College of Physicians, his purse was often opened to defray the cost of diplomas, degrees and fees for young men without the necessary funds." A daughter, Miss Jean Belleau, one of his 11 children, was the wife of the late Dr. Charles Vézina, Dean of the Faculty of Medicine, Laval University.

Dr. A. G. Belleau was the first, probably the richest and certainly the most generous General Secretary.

The second holder of this appointment, Dr. William Canniff of Belleville, was elected in 1868, evidently on the assumption that his place of residence made it possible for him to facilitate the arrangements for the Second Annual Meeting which was to be held in Toronto in 1869. Dr. Canniff had been one of the founding members of The Association, had been elected corresponding secretary for Ontario at the organization meeting and had been an original member of the Committees on Constitution and By-laws, Vital Statistics and Ethics. His career included graduation at the Toronto School of Medicine, postgraduate work in New York and London, a period of service as medical officer in the Crimean War, appointment as Professor of Pathology and later of Surgery in the medical department of Victoria University, and the authorship of two valuable historical works on the pioneers of Upper Canada. This colourful character led a life of high adventure and incredible industry punctuated by periods devoted to practice in the town of Belleville. It is evident that in his arrangements for the Second Annual Meeting he had provided for a varied scientific program, but so much time was consumed in the stormy business sessions that only two papers could be presented. Although he occupied the position of General Secretary only briefly, the record shows that William Canniff continued to be a very active member of The Association and its committees for many years.

There followed a sensible change when The Canadian Medical Association departed from its original custom of electing the General Secretary for a one-year term, and in 1869 Dr. A. H. David of Montreal was installed in office. He served for 12 years, from the Third to the Fourteenth Annual Meetings. He was a man of solid accomplishment in general practice, in medical teaching at the St. Lawrence School of Medicine and subsequently at Bishop's College where he became Dean, a medical officer in the fighting of the rebellion of 1837-39, co-editor of the *Canadian Medical Journal* and a governor of the College of Physicians and Surgeons of Quebec. Although the records and transactions of The Association make little personal reference to Dr. David, he must be counted as one of the most notable figures in the history of our organization. His re-election for so many terms suggests that he was held in high esteem by the pioneers of our Association and the evidence of self-effacement suggests that he was an early advocate of the secretarial tradition that the incumbents of this position should be organizers and administrators, not makers of policy. Dr. David relinquished the office in 1881 and shortly thereafter died of gastric carcinoma.

The fourth General Secretary was William Osler, the patron saint of Canadian medicine. Abler biographers than the writer have recorded the career of this remarkable man, and these notes will briefly record only his relationship to The Candian Medical Association. The Transactions of the Tenth Annual Meeting (Montreal 1877) show on the title page the personnel of the Publication Committee. Dr. David, the General Secretary, was Chairman, and Dr. Osler, the Secretary of the Committee. Osler was also Chairman of the Committee on Necrology and his

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report, as well as the language of the Transactions as a whole, is characteristic of his literary power. The record of this meeting shows Osler reporting on behalf of the Committee on Arrangements, for the Nominating Committee and volunteering to raise a subscription for the publication of the Proceedings. These typical evidences of energy and enthusiasm indicate that Osler had thrown himself wholeheartedly into the activities of The Association, and one imagines that he was the obvious choice for General Secretary when Dr. David relinquished the post. The reporting of the event in Cushing's monumental biography adds a slightly cynical note: "This same swarthy young Canadian had returned home [from England] too late to attend another meeting, namely that of The Canadian Medical Association held in Halifax early in August [1881], and was penalized for his absence by election to the onerous position of General Secretary . . ."

The minutes of the Fifteenth Annual Meeting (Toronto 1882) are the first which bear his signature as General Secretary. The topic of the Dominion Medical Bill to provide uniform medical registration had occasioned much discussion at the early meetings of The Association, but by 1882 it was supplanted by the efforts of The Association to have established a bureau of vital statistics and a department of public hygiene.

Osler did his job well, brightened up the program of the meetings, and attracted an attendance of members greater than any previously experienced. It is recorded that at the Annual Meeting held in Kingston in 1883, he became so incensed at the views presented in a paper that at its conclusion he confronted the speaker, "waved a copy of the Code of Ethics in his face and publicly denounced him". Despite this lapse from proper secretarial respect for the members, it was Osler's decision to accept appointment to the chair of Clinical Medicine at the University of Pennsylvania and his election to the Presidency that terminated his tenure of the "onerous position". Osler's speeches and writings are full of references to the value of medical organization and to the need of doctors to attend meetings, and one feels that his experience as General Secretary added conviction to his words.

As Dr. Routley's successor, I have a fellow feeling for James Stewart of Montreal, who followed the brilliant Osler in 1883 and held the office of General Secretary until 1886. His reputation for taciturnity survives to this day, probably because a contemporary immortalized him by remarking, "Stewart's grunt represents another man's monologue." It seems likely that he was a man of average attainments who suffered by contrast with his predecessor. Perhaps the flowery and long-winded oratory characteristic of his day affected him as it would a modern listener lacking the secretarial device of tuning out. Dr. Stewart carried on a flourishing practice on the principle of "tell them nothing", but expressed himself in print as one of the Editors of the *Montreal Medical Journal*.

In 1887, Dr. James Bell of Montreal was elected General Secretary. At the time he was medical superintendent of the Montreal General Hospital, where he subsequently served as attending surgeon. On the opening of the Royal Victoria Hospital in 1894, he was appointed to the surgical staff, and on his death in 1911 he was head of the Department of Surgery of McGill University. A citation by that Corporation states in part, "Indefatigable as a worker, conscientious, accurate and thorough in everything he undertook, he was a most helpful and valued counsellor . . ." After he relinquished the General Secretaryship in 1890, he continued to serve The Association and was Chairman of the Finance Committee which negotiated all matters relative to the establishment of the *Canadian Medical Association Journal*.

The seventh in the succession of General Secretaries was Dr. Herbert Stanley Birkett of Montreal, who held the appointment from 1890 to 1893. Dr. Birkett brought to the position those qualities of heart and mind which enabled him to attain eminence as an otolaryngologist, teacher, soldier, historian and outstanding citizen. A man of many parts, there is little doubt that his influence on The Association was salutary and that his continued loyalty until his death in 1942 provided a good example for lesser men.

He was succeeded in 1893 and for the subsequent eight years by Dr. F. N. G. Starr of Toronto. Vigorous, outspoken, loyal and tireless, he served The Association well during a period when great difficulties had to be overcome to keep the organization alive. His contemporaries attribute to him credit for surmounting the handicaps of geography, sectional interest and lack of finance and of leaving The Association much stronger than when he began his secretaryship. Dr. Starr subsequently rose to high positions in surgical and academic circles but his interest in and efforts for the C.M.A. did not diminish. The Frederic Newton Gisborne Starr Award, "the V.C. of Canadian medicine", remains to honour his memory.

Dr. George Elliott of Toronto became the ninth General Secretary in 1901 and served in that capacity until 1909. It is interesting to observe that during his tenure of office the British Medical Association met in Toronto in 1906 and his predecessor was recalled to act as local secretary for this meeting. Editorial comment in the *Montreal Medical Journal* pays tribute to Dr. Starr, "who has proved so painstaking and so successful a secretary. The labour for many months has for him been incessant and arduous and it is but right that the sacrifices of much strength, and even health, in the service of The Association, should be acknowledged with gratitude." Dr. Elliott had been a school teacher and a commercial traveller before undertaking the study of medicine, thus, as the writer of his obituary remarks, "broadening his outlook on life". In addition to serving as General Secretary of The Association during a period of growth and development, Dr. Elliott was proprietor, publisher and editor of the *Dominion Medical Monthly*, a journal which survived until 1921. These exacting duties were discharged while he conducted a large practice with conscientious care and skill. His obituary expresses very well the situation of many incumbents of the position of General Secretary when it describes his services as "an indication of his willingness to do a good deal of dry unremunerative work for the good of the profession, and also of the confidence and good will of his confreres".

There followed for a period of three years (1909 to 1912) another brilliant figure in the person of Dr. Edward Archibald of Montreal. Although he may be remembered chiefly for his outstanding personal qualities and for his international reputation as a master surgeon, Archibald was in a key position as General Secretary to exert great influence in the

establishment of the *Canadian Medical Association Journal*. From the turn of the century, it had been evident to the policy makers of our Association that a journal to perform the functions of an official organ was essential. There were substantial handicaps to the accomplishment of an objective which at this distance appears obvious. There were vested interests in existing journals, several of which had been well disposed towards The Association, there were sectional loyalties, there were the interests of publishers and printers, and finally there was the financial hazard of a venture of this sort by an organization not well endowed with funds. All of these obstacles were overcome by men of good will and vision. The *Maritime Medical News* voluntarily suspended publication and the powerful *Montreal Medical Journal* merged its identity with the *Canadian Medical Association Journal*, which issued Volume I, No. 1 on January 1, 1911. It would be unfair to the devoted efforts of many other men to attribute to Archibald primacy in this significant event in the development of our Association, but as General Secretary and member of the Finance Committee he unquestionably rendered yeoman service. In this and in the other duties of the appointment he brought to bear a keen intellect and a personal integrity which made it possible for his contemporaries to overlook in him the complete absence of one of the basic qualities of a secretary—punctuality.

In August 1913, Dr. W. W. Francis assumed the office of General Secretary and although this might be quoted as an example of nepotism, the interval between the retirement of his uncle, Sir William Osler, and the appointment of Francis absolves both parties. Until his death at the age of 81 on August 9, 1959, Dr. Francis was a living link with the activities in the period immediately preceding World War I. He was the chief executive officer for the Forty-sixth Annual Meeting in London and the Forty-seventh in Saint John and he recalled the detailed arrangements which fell to his lot, including the collection of the annual fee from those in attendance. In addition to his secretarial tasks, Dr. Francis acted as Assistant Editor to Dr. Andrew Macphail, and his recollections were not of stately editorial prose but of quarrels with the printer over his tendency to accept and include advertising which was objectionable. With the outbreak of war in August 1914, The Association lost its General Secretary to No. 3 Canadian General Hospital and the affairs of the C.M.A. entered a state of suspended animation. After service in France until 1918, Francis undertook the cataloguing of Osler's library at Oxford and brought it to Canada in 1928. He has since served as Librarian of the Osler Library at McGill University, a post which he adorned until his recent death.

John Wallace Scane was next in the series of stalwart Montreal members who served The Association as General Secretary. Elected in 1915, his tenure encompassed the difficult years of World War I, the nadir of The Association in 1920 and its phœnix-like rise from the ashes in 1921. Dr. Scane was a teacher of physiology and pharmacology at McGill and Assistant Dean in the Faculty of Medicine. His contemporaries refer to the liking and respect which he inspired and to his genuine candour and sound judgment. His death at the age of 54, in May 1923, brought to a close an era in the development of the C.M.A.

The act of faith of the members who at the Halifax meeting in 1921 pledged their financial support of a floundering organization was accompanied by an appointment which was even more significant. A young man, Thomas Clarence Routley, had emerged from World War I to enter practice in Toronto and incidentally to devote his time and talents to the position of Secretary of the Ontario Medical Association. Already his organizing ability was becoming manifest and our far-sighted predecessors discerned in him those qualities which the profession needed so badly and appointed him assistant to the ailing Dr. Scane. In 1923, Dr. Routley was confirmed in the position of General Secretary and became the first full-time executive officer of organized medicine in Canada. The term "disorganized" medicine might more appropriately be applied to the condition of our affairs when T.C.R. took over, but through hard work, infectious enthusiasm and shrewd business sense oddly combined with the missionary spirit, he wrought a miracle. To him, more than to any other individual, we owe the progress which The Association made during the 31 years in which he added lustre to the post of General Secretary. The writer came under the Routley influence early in his professional career and although their characters are quite dissimilar, 22 years of almost daily contact have not impaired his admiration for this great man. We must await the writing of his biography for the full detail of his work and worth to the medical profession of Canada and the world. The epitaph of Sir Christopher Wren, "Si monumentum requiris, circumspice", applies equally well to Clarence Routley, and if any C.M.A. member desires to be acquainted with his work, he has only to look around him.

On attaining the age of 65, Dr. Routley retired from the appointment of General Secretary at the Eighty-seventh Annual Meeting in Vancouver. His native ability and the acquired wisdom of 31 years' service to the profession are retained to the C.M.A. because he continues to carry out the duties of Managing Editor of the Journal, and his services as consultant to The Association, its committees and its staff are utilized to the full.

The secretarial story would be incomplete if mention were not made of Dr. G. Harvey Agnew and Dr. Grant Fleming. Although neither of these gentlemen occupied the appointment of General Secretary, both rendered outstanding service as Associate Secretaries.

Dr. Agnew was appointed in 1927 and his duties in connection with the Department of Hospital Service led to the formation of the Canadian Hospital Council, now the Canadian Hospital Association. Although his work was primarily in the hospital field, including the approval of hospitals for the training of interns, he was a key figure in the work of the Committee on Economics and much of the official record of our economic development bears the stamp of his thinking. He retired in 1945 to devote his talents to the Canadian Hospital Association and now is the principal in the firm of Agnew, Peckham Associates, Hospital Consultants, and Professor of Hospital Administration at the University of Toronto.

Dr. Grant Fleming, a distinguished worker in public health, was appointed Professor of Public Health and Preventive Medicine at McGill in 1927. A year later he assumed the part-time post of Associate Secretary in the C.M.A. and from 1928 to 1936 contributed

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mightily to health education, tuberculosis control, mental hygiene and the study of medical economics. His industry and his administrative capacity excited the admiration of all who knew him, and his belated appointment as Director of Hygiene in the Canadian Army in late 1942 was terminated by his death in April 1943.

No account of the secretarial succession would be adequate without reference to two ladies now living in retirement who served The Association so well as the presiding genius in the office of the General Secretary. Reference is made to Mrs. Lena Lang and Mrs. Mabel Campbell. A recent communication from the former provides a revealing glimpse of the way we have come:

"I see from your letter that you did not know that I was The Association's first employee. I started in September 1911 when Dr. Edward Archibald was General Secretary and the office was in his house at 160 Metcalfe St., Montreal. It was Association work I was engaged to do at a salary of $40.00 a month. A year or so later when Dr. W. W. Francis took over from Dr. Archibald, we moved to McGill. Those were The Association's lean days, for when the Editor, Dr. Macphail, also needed some clerical help, there was at times not enough cash to meet our meagre salaries. That did not dampen my interest, which became so keen that I used to look forward to what others called 'blue Mondays'. The work grew and with it responsibilities, especially after Dr. Francis had left for overseas with the McGill General Hospital. Dr. Scane, his successor, inherited all the difficulties. Dr. Routley I met for the first time at the Annual Meeting in Hamilton (1918). He was in uniform and still troubled by a cough."

Mrs. Campbell, who is an occasional welcome visitor to C.M.A. House, recalls the office in the attic of Dr. Routley's home on Oakwood Avenue, the move to accommodation provided for many years by the University of Toronto, and successive short tenures of rented premises. A veteran of at least 30 Annual Meetings and countless sets of minutes, the operative force behind the paper work involved in successive projects, Mrs. Campbell still retains a lively interest in the affairs of the C.M.A., and her approving word for the augmented staff provides the inspiration we need to further progress.

Four incumbents of the appointment of General Secretary have been honoured by election to the Presidency of The Canadian Medical Association: Dr. William Canniff in 1880, Dr. William Osler in 1884, Dr. F. N. G. Starr in 1927, 28 years after relinquishing the former post, and Dr. T. C. Routley in 1955, when he also became President of the British Medical Association.

There they are, the brilliant, the pedestrian, the "characters" and the obscure. Until the appointment of Clarence Routley as the first full-time General Secretary they were men preoccupied with the demands of practice and teaching and yet they found time to serve their colleagues and to provide the cement which enabled the individual building stones of a great profession to be mortared into the structure which we call organized medicine. With notable exceptions they were conservative in attitude, a characteristic which is not far removed from the common denominator of our profession, yet on occasion they emerged as the courageous champions of progress. Their services to medicine and to the advancement of the health of their fellow citizens deserve our tribute of grateful remembrance.

MEDICAL MEETINGS

SECOND WORLD CONFERENCE ON MEDICAL EDUCATION

Six years after the First World Conference on Medical Education had been held in London, England, the Second opened in the Palmer House Hotel, Chicago, on Monday, August 31. The theme was "Medicine—A Life-Long Study" and the conference was under the auspices of the World Medical Association in collaboration with the World Health Organization, the Council for International Organizations of Medical Sciences, and the International Association of Universities, assisted by the American Medical Association and the Association of American Medical Colleges. It continued from Monday to Friday, August 31 to September 4, and attracted nearly 800 medical educators from 66 countries. Approximately half of the participants came from the United States, while Canada had the second delegation with 32 persons.

The structure of the conference followed very much that of the first; the opening day was a plenary session, the next three days were devoted to four concurrent sectional meetings, and the last day again was a plenary session in which rapporteurs from the four sections presented the highlights of their deliberations. Of these four rapporteurs three were from the United States and the fourth (the Editor of this Journal) from Canada.

The president of the conference was Dr. Raymond B. Allen, who has just been appointed Director of the United States International Co-operation Mission to Indonesia, while the deputy presidents were Dr. R. F. Farquharson of Toronto and Dr. Victor Johnson of the Mayo Foundation. Each section had two vice-presidents, the list containing names from Japan, Colombia, United Kingdom, Austria, Belgium, India, Chile and the United Arab Republic.

The conference opened with a reading by the president of a letter from the patron, President Eisenhower, in which he brought greetings to the participants and wished them success. In his opening oration, Dr. Allen said that never had a conference been convened at a time of greater ferment. It was perhaps not too much to say that this was a period of crisis, a crisis of adaptation of science and technology to the problems of the revolution of rising expectations of people everywhere. Demands for the benefits of science and technology were great and the problems of medical eduation and medical service extremely urgent. After mentioning Albert Schweitzer's reverence for life, he said that as we learn to respect ourselves we learn to respect all life, and especially human life. Out of disregard for human life have grown the crises and struggle of our times. It was the modern tragedy that although there was enough for everyone's need, there was not enough for everyone's greed. Professor W. M. Arnott of Birmingham, England, then gave a summary of the proceedings of the First World Conference, which was devoted to

undergraduate education. In conclusion, he emphasized the fact that life-long maintenance of a high standard of informed, critical and conscientious practice depended more than anything else on avoidance of professional isolation. The generally high standard attained by medical teachers was partly due to the fact that they worked constantly in the fierce light of criticism by their colleagues and even more so by their students. Promotion of professional association therefore demanded great attention.

Mr. Ian Aird of London, England, then discussed certain results of the First World Conference, mentioning replies to a questionnaire which he had sent to a number of the medical teachers who had attended it. About 20% of those who replied said that they had learned nothing new at the conference, but the great majority expressed strong appreciation of it and of the opportunity for informal conversation with delegates from other schools and countries. Most believed that it had been responsible for a freshening revival of educational ideals. The published proceedings of the conference had been of very great value to those responsible for starting new medical schools, and it would seem that it was most appreciated by delegates from less wealthy and less highly industrialized countries. As a direct result, some medical schools had adopted new educational devices for assessing the character and intelligence of applicants for entrance. Mr. Aird suggested that W.H.O. and W.M.A. might explore further the possibility of maintaining a world index of medical films, though he felt that a central museum of teaching material was not a practical project. He was glad to see that the Second Conference contained more panel discussions than the First, since this had been a subject of criticism.

The first three papers of the Monday afternoon session by Drs. Grzegorzewski, Sheth and Monteiro dealt with international co-operation in postgraduate education. Dr. Grzegorzewski said that we should seek answers to the following questions: How may further internationally assisted programs be developed, best suited to future responsibilities of postgraduate students? How may the various international efforts be co-ordinated? How can language barriers be overcome? And how can the inherent permanent values of medicine be preserved, enriched and made universal? Dr. Sheth dealt with the problem as it affected his own country, India. International help was needed in view of the acute shortage of medical teachers and indeed of doctors in general. He wanted to see a true exchange of teachers from highly developed and underdeveloped countries, and further suggested that the teacher from the underdeveloped country stay in the other until his counterpart had returned. He felt that people on foreign fellowships often required a second visit to the country to obtain the best results from their stay abroad. Dr. Monteiro of Singapore felt that exchanges should not be limited to one or two well-known countries but should be widely spread, saying that he did not believe that there were in fact antagonisms in medicine in different areas of the world. He also stressed the fact that underdeveloped countries could contribute much to the development of postgraduate medical education.

Dr. Victor Johnson of the Mayo Foundation then made a vigorous plea for participation in research as a component in the education of both undergraduates and postgraduates. He was particularly concerned that medical students should have a taste of this work, citing as benefits a sharpened judgment, an awareness of the amount of effort required by investigators, the cultivation of a medical hobby, the lessons provided in team work, and the respect for persistent routine which is developed. Dr. Farquharson of Toronto then discussed the value of participation in research as a factor in continuing education of the practising doctor. He said that searching was the important factor in education, not getting the answers. The searching of a general practitioner was of a different intensity from that in the laboratory, since his searching was spread at first over the broad area of his practice. The practitioner should do research in some aspect of his regular work, for the pursuit of research in practice was not and should not be a separate component of a doctor's life. The constant practice of describing symptoms, signs and other important factors in concise, clear and exact language enhanced the practitioner's ability to recognize important findings and put them in proper perspective. Practitioners as a body played a large if inconspicuous role in the advancement of medical knowledge. The accumulated good sense of a large number of thoughtful doctors had a wonderful influence.

On the three following days, a vast number of papers were read and some nine panel discussions were also held; in addition to this, there was a demonstration of the newer audio-visual aids arranged by Mr. Ralph Creer of the American Medical Association. On Friday, the section rapporteurs and vice-presidents gave their views on the preceding three days' work. Section I had discussed basic clinical training for all doctors, and Dr. Luckey (U.S.A.) summarized their findings. He pointed out that the curriculum should provide a balanced base for any type of further life-long study, and that this would mean compromise. Participants had been worried about the establishment of two different levels of training for undergraduates; nevertheless there was interest in some type of assistant doctor to meet urgent needs in underdeveloped areas. The learning methods employed should not hinder the brilliant student and should give excellent help to the poor student. There should be more small group and bedside teaching to develop sound methods of patient observation. Integration of specialties into the general curriculum was very difficult, but one feasible method was by creation of a polyclinical service in which care was given by both generalists and specialists. The passive resistance of students to learning social sciences suggested that a formula for integration of these sciences into a medical course had not yet been found. Repeated emphasis was laid on the value of student research. Many reasons were given for incorporating an extramural clinical preceptorship, but the rapporteur did not think these valid. The two vice-presidents referred to the rise in social medicine since the last conference, noting the variation in emphasis on socio-economic factors from country to country and the value of home visiting by the student in teaching preventive medicine. They also said that excessive and early teaching of specialties was generally deprecated by participants.

Section II had discussed advanced education for general and specialty practice, and Dr. Oliver Cope (U.S.A.) said that speakers had plunged bravely into both topics but the swimming was rough. There was general dissatisfaction with the general practitioner, and not even agreement on the definition of the term, or

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on his functions. The commonest complaint was about his defective education, for which some speakers blamed the faculties; some wanted the general practitioner to be brought in as a teacher. The general practitioner's job was a difficult one and as presently set up almost impossible to perform. His knowledge was less than first-rate because of the large number of subjects he had to cover, and he was forced to practise at a sub-standard level compared to the specialist, a fact which immediately put him in a second-class place. No amount of postgraduate education could remedy this. The job was basically unsatisfactory for an intelligent student seeking an interesting task. Dr. Cope then gave as his personal opinion that the remedy was not to introduce unqualified general practitioner teachers into the faculty. The ultimate solution might lie in group practice, with the internist in the group as the family doctor. If once we knew what type of general practitioner we wanted, we could formulate his program.

On the other hand, discussion on specialist education ran much more smoothly; there was general agreement on the need for residency programs, though the almost fanatical craze in the United States for very narrow specialties had passed the point of reason. The sense of unity in medicine had been killed and we were approaching medical anarchy. The fault lay with the clinical practitioners and not with the medical faculties, and correction would be very difficult. One of the vice-presidents, Sir George Pickering, Regius Professor of Medicine at Oxford, dealt with internships, pointing out that so many interns were needed that many had to work in second-rate or third-rate hospitals. The latter should at least provide good-quality staff, post-mortem examinations, library facilities, one weekly discussion and time for the young doctor to read in the library. In specialty training, the trainee should spend adequate time in general medicine and surgery before narrowing his studies. Voluntary courses in basic sciences should accompany residency programs. The other vice-president, Dr. Fuchsig of Austria, said that in France and Austria not more than 10% of all general practitioners participated in postgraduate training, although all types of programs had been tried. The most important handicap here was the lack of competent paid substitutes while the practitioner attended courses. He suggested that professional associations should organize a scheme to provide substitutes either on a regional basis or by use of interns.

Section III on the development of teachers and investigators probably had the easiest task. Summarizing, Dr. T. B. Turner (U.S.A.) said that the title suggested that teachers and investigators were allied and a good investigator was necessarily a good teacher and vice versa. The three qualifications of a good teacher were (1) ability to convey knowledge; (2) postgraduate entrainment; (3) capacity for original work. All over the world there is a shortage of both investigators and teachers, and recruitment and opportunities for work and advancement were unsatisfactory. The full-time teacher in North America apparently lacked prestige. He described experiments in student research, which he considered to be valuable since a man could not select a field of science to work in until he had tasted it. Taking U.S. figures, he showed how very few persons were carrying the burden of medical teaching or research. Responsibility for developing teachers and investigators rested with the medical faculty, for only they could stimulate recruitment. He said that the section had opposed rigid formalization of post-doctoral training, though the latter must not be allowed to become chaotic for fear of wasting time and money. Some comment had been made on the need to teach teachers how to teach. In conclusion, he said that four ideas had recurred in discussions: (1) that the teacher must be an investigator; (2) that the investigator must be a teacher; (3) that the teacher-investigator must be found early and helped to develop; (4) that the superior teacher-investigator must be a citizen of the world.

During discussion of this section's work, the voice of dissent was raised by Dr. Miller (U.S.A.), who pointed out a lack of substantial knowledge of the results of educational programs. Two reports on general practice in the United Kingdom and the United States had given no cause for satisfaction. He wondered why excellent research workers should be expected to be excellent teachers also, and asked for the accumulation of more data before a third world conference was held.

Summarizing the work of section IV on continuing medical education, Dr. S. S. B. Gilder (Canada) said that the other sections had gone over much of the ground on which he was about to report. He noted that in his section several speakers had complained that a lot of time was spent discussing purely technical training and forgetting about education in the broad sense, which included a wide acquaintance with the humanities and social sciences. It had been pointed out that the failure of technically efficient doctors to fill the traditional role of family guide, philosopher and friend, was related to the quality of human compassion, and that the latter could not be taught in medical schools and must be learned in early childhood in the family. As in section II, discussion had centred more on postgraduate education of the family doctor than of the specialist. Although satisfaction had been in general expressed with specialist training programs, dismay was expressed at the small number of general practitioners participating in continuing education. The causes of this relative neglect were overwork and lack of money. Tax relief, creation of fellowships and grants, efforts to cheapen production and distribution of textbooks and journals, and provision of substitutes during courses were recommended. If the doctor was to be induced to take his responsibilities for his future education seriously, he must be carefully indoctrinated from his first day in the medical school, when he should be told that he was starting on a life-long pursuit of knowledge. Postgraduate education could be dealt with either by compulsion or by voluntary effort. In countries where doctors were employed by the state, compulsory refresher courses were common; in other countries voluntary action needed to be effective, otherwise the government might step in. Speakers had stressed the fact that the most important technique of postgraduate education was by contact with colleagues. This was expensive, but discussion of errors and difficulties with a colleague or study of a carefully drafted hospital report was invaluable. Nothing took the place of personal contact, and the character of the teacher was the key factor of success or failure in postgraduate programs. Clinical teaching was of paramount importance, and instruction in social sciences, for example, must be done in a clinical setting. Not all speakers were convinced of the value of research in education. In Germany practitioners estimated that 70% of their education was obtained through reading and only 30% through audio-visual methods; they were not satisfied with this distribution, partly be-

cause of the difficulty of finding good authors capable of writing good teaching articles. Efforts have been made in Germany to bring together authors, editors, practitioners and teachers to raise the level of educational writing. In France there was a weekly summary of the medical press over the state-owned radio, while in New York State postgraduate education had been greatly stimulated by inauguration of a two-way radio program, transmitted from a medical school and heard in 24 peripheral hospitals once a week, with a case presentation and questions from listeners. Postgraduate programs must be adapted to local conditions, and a preliminary survey of the local situation was necessary. It was pointed out that contact should be two-way; i.e. teachers should go out to the periphery as well as having students from the periphery come in to the centre. Discussion of the division of responsibility for postgraduate education had made it clear that the university ought to assume primary responsibility for its students for the rest of their lives, and that it should do so in liaison with professional associations. It was generally agreed that it was proper to accept aid from industrial and commercial sources, provided that this was forthcoming unconditionally.

Discussion of the assessment of results of postgraduate programs showed how little was known on this subject. The popularity of a program was usually assessed in terms of numbers attending and the subjective satisfaction felt by the participants, but it was doubtful whether these were good long-term criteria. Investigations had made it clear that practitioners did not know what they wanted educationally, and that what they wanted might not be identical with what they really needed. Though everyone was prepared to say what ought to be done in postgraduate education, no one was prepared to say exactly how it should be done.

After some discussion, and the general summary of the conference by Dr. Ward Darley (U.S.A.), the final paper was by Sir Arcot Mudaliar (India), Vice-Chancellor of the University of Madras, who gave a statesman-like address in which he said that medical education was a field in which there could be no rivalry, no jealousy and no secrecy. He deplored the absence during the conference of reference to the sister professions, such as nursing, public health engineering and so on. He still felt that the general practitioner was the backbone of the profession and that specialism could not exist without him; therefore the specialist had the responsibility of arranging postgraduate education for the general practitioner. The standard of general practice was a correct index of the state of the medical profession in a country.

Finally it should be recorded that the conference included showings of medical films, television demonstrations, and a scientific and technical exhibition.

FIRST INTERNATIONAL MEDICAL CONFERENCE ON MENTAL RETARDATION

On July 27, the First International Medical Conference on Mental Retardation opened in Portland, Maine. Amongst its sponsors were the American Academy of Pediatrics, the American Psychiatric Association and the Maine Medical Association. The gathering was timed to follow the International Pædiatric Congress in Montreal and was attended by about 550 delegates, representing 30 different countries. Its speakers included workers of long standing as well as others more recently attracted to "this last frontier of medicine".

P. Plum, professor of pædiatrics, University of Copenhagen, was to have acted as chairman on the first day, but in his absence these duties were taken over by J. W. Gerrard, professor of pædiatrics, University of Saskatchewan. The first paper was read by Paul Yakovlev (Harvard), who traced briefly the phylogenetic and ontogenetic development of the human brain, and pointed out that when reduction in brain size occurred in defectives, diminution was proportionate rather than limited to any specific part. He was followed by Josef Warkany (Cincinnati), who spoke on the experimental production of congenital malformations of the central nervous system. Dr. Warkany prefaced his talk by warning against the uncritical application of animal experiments to the human subject. In a well-illustrated lecture he emphasized the importance of the eight-week period as the source of most abnormalities and traced in detail the development of spina bifida and anencephaly. The morning session concluded with a paper by Y. Y. Hsia (Chicago), which furnished a broad survey of enzymatic defects related to mental defect.

The afternoon was devoted to neurophysiological and neuroanatomical concepts. A paper on the autonomic regulation of the brain was read for E. Gellhorn (University of Minnesota), in which were described fundamental characteristics of the autonomic system and disturbances resulting from imbalance. A paper dealing with normal and abnormal electrogenesis in the fetal brain was prepared by Morrell, Bradley and Kaiser (University of Minnesota). The final paper of the day, by V. R. Ingram and I. R. Knott (University of Iowa), brought the audience up to date on the roles of the upper brain stem and basal forebrain in animal behaviour.

The second day opened under the chairmanship of G. Jervis (Columbia University). The first paper was by P. Schwartz (Frankfurt am Main, but currently at Warren, Pennsylvania). The subject was cerebrospinal birth injury and mental deficiency, and the paper covered types, causes, pathogenesis, consequences and prevention. His thoughtfulness in providing a comprehensive printed résumé of his work might well have been emulated by others. L. S. James (Presbyterian Medical Center, New York) discussed the effect of the delivery process and the onset of respiration on acid-base balance of the newborn. It was suggested that the intrauterine environment was less anoxic than had hitherto been believed. Brain metabolism before and after birth was discussed by Willamina Himwich (Galesburg State Research Hospital). Dr. Himwich did not minimize the difficulties inherent in this type of research; she considered that no direct basis existed for comparison between animal and human studies, and that it had not yet been possible to reproduce mental defect in animals. She was followed by Hilda Knobloch (Columbus, Ohio), who read a paper prepared in collaboration with her husband, B. Pasamanick, professor of psychiatry in the same center. It again put forward the view they had previously formulated of a continuum of reproductive casualty whose sublethal component consisted of cerebral palsy, epilepsy, mental deficiency and childhood behaviour disorders.

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In the afternoon J. D. Spillane (Cardiff, Wales) took up the subject of developmental anomalies in the region of the foramen magnum. He described these conditions in detail and insisted on a clear distinction between platybasia and basilar impression. He reminded his audience that platybasia simply meant an increase in the basal angle of the skull and that it had no known clinical significance, whereas basilar impression, so often used as a synonym for platybasia, implied actual invagination of the rim of the foramen magnum, the consequences of which were potentially serious. The subsequent paper on the Treacher-Collins syndrome by L. Kulczycki (Harvard) described the general characteristics of the condition. Referring to the frequently related deafness and behaviour disorder, the speaker urged the need to make full allowance for them in any assessment of intellectual retardation. H. Asperger (Innsbruck, Austria) followed with a paper on infections and mental deficiency. He particularly mentioned the increase in frequency and severity of virus diseases as well as their increasing neurotrophic complications. Dealing with the general sequelæ of the encephalitides, he observed that trophic disturbances, which could occur up to seven years later, were indistinguishable from the stigmata of mental defect. He cited abnormalities of hair growth, dental anomalies and proliferation of gums, and even a neanderthaloid overgrowth of the lower jaw. Thus brain damage from encephalitis could simulate genetically determined abnormality. The remaining paper of the session, on prenatal infections, was given by J. Sutter (University of Algiers). He listed the various infections of the mother known to cause mental defect in the child, and expressed the opinion that the occurrence of intrauterine infections might be facilitated by some genetic factors related to the physical or mental deficiency of the mother. (Dr. Sutter was the first participant to employ French as his medium.) Later in the day a film was shown by A. Minkowski (Director of the Centre de Recherches Biologiques Néonatales de Paris), illustrating the changes in reaction occurring in premature infants at the age of seven and a half months.

On Wednesday the chairman was Asbjörn Fölling of Tvedestrand, Norway, and fittingly enough, much of the day was devoted to consideration of phenylketonuria which he had been the first to discover. The opening paper was a general survey of inborn errors in protein and amino-acid metabolism by R. S. Paine (Harvard). Employing the classification of single aminoaciduria, multiple but patterned aminoaciduria, and generalized aminoaciduria, he gave examples of each group associated with intellectual retardation. Horst Bickel (Marburg, Germany) then dealt with the dietary treatment of phenylketonuria, warning that the blood phenylalanine level might be above normal limits even in cases where the urine showed a negative ferric chloride reaction. He concluded his talk with a commentary on films showing regression in a treated phenylketonuric when excess phenylalanine was added to the diet, and improvement in behaviour, even if not in I.Q., of older children after six or more months of dietary treatment. P. B. Diezel (University of Heidelberg) took up lipid and carbohydrate metabolism in relation to mental defect. He dealt more particularly with the histological picture of the various entities concerned, and drew attention to the neuromuscular form of glycogenosis. A résumé of current knowledge of copper, iron and lead metabolism in relation to the brain was presented by J. N. Cumings (London, England), and the morning session ended with a paper prepared by J. Wortis and E. Jackim (Division of Pediatric Psychiatry, Jewish Hospital, Brooklyn), the purpose of which was to indicate the existence of a blood-serum toxin in phenylketonuria.

Cuming's second paper began in the afternoon. Dealing with the chemical basis of phenylketonuria, he instanced the normally high concentration of 5-hydroxy-tryptophan-carboxylase in some areas of the brain and suggested that phenylalanine might inhibit this. H. D. Grumer of Pownal then read a brief paper on a tolerance test in phenylketonurics with *p*-hydroxyphenylpyruvic acid. H. A. Waisman (University of Wisconsin) suggested a determination of tyrosine levels as an alternative to the more difficult phenylalanine tolerance test for heterozygotes. Especially interesting was his statement that phenylpyruvic oligophrenia had been produced in monkeys by feeding them very high amounts of phenylalanine. In this way the fasting blood level had been raised to heights typical of blood levels in phenylketonurics. The speaker mentioned that psychological tests were now in progress to determine whether the biochemical findings were accompanied by mental changes comparable to those in the human subject. The question of autonomic responsiveness in newborn and older children, with special reference to the retarded with chronic brain syndrome, was taken up by E. W. Gordon and J. Wortis (Jewish Hospital, Brooklyn). The remaining feature of the day was the description of a simple rapid method of detecting aminoaciduria in retarded children, by H. Ghadimi (Shiraz University Medical School, Iran), and H. Schwachman (Children's Center, Boston). Fundamentally it was a screening procedure for gross detection.

Thursday's session commenced under the chairmanship of G. Frontali (Rome, Italy). The first paper was a masterly presentation of current knowledge on the pathology and physiology of mongolism. In its course Clemens Benda (Worcester, Massachusetts) put forward his well-known view that mongolism represented a deceleration of embryonic development. He pointed out that this took place after about six weeks of apparently normal progress, and he made a strong appeal for more intensified research. J. Oster (Randers, Denmark) also discussed mongolism. He agreed with Benda in deprecating the influence of heredity. He considered that twin investigations favoured a factor operative early in pregnancy. Oster also speculated whether mongolism might not be increasing as the result of greater use of antibiotics. After a short intermission for exhibits and films, a paper on erythroblastosis and mental defect was given by W. W. Zuelzer (Wayne State University, Detroit). Zuelzer redefined kernicterus as bilirubin encephalopathy. He considered the neonatal blood-brain barrier was more permeable to bilirubin than the same barrier in older children or adults, and that its strength varied widely in infants. This subject was also discussed by H. S. Baar (Pownal, Maine). Baar however doubted whether an indirect bilirubin toxæmia was the complete explanation. The central nervous system in congenital heart disease was discussed by M. Cohen (University of Minnesota). The unusual susceptibility of congenital heart disease cases to central nervous system damage was witnessed by a series of 250 autopsies,

all of which showed severe congestion and petechial hæmorrhages.

In the afternoon R. Kundratitz (University of Vienna) presented a paper on therapy in mental deficiency. Kundratitz made an impassioned plea for a more intensive therapeutic approach to mental retardation. Any measure which held out even the remotest hope of amelioration was justified. He dealt with tranquillizers and drugs acting on the autonomic nervous system, hormones, vitamins, glutamic acid, and malarial therapy. Justifying the use of thyroid, he mentioned that investigations with radioactive iodine at his clinic had shown a not inconsiderable number of defectives to have subnormal thyroid activity even in the absence of the classical picture of hypothyroidism. Cautious on the question of glutamic acid, he still felt it might have a place, since glutamic acid levels in the C.S.F. of defectives were frequently low and rose after treatment. But it was probably his advocacy of malarial therapy in defectives that struck his audience most. Encouraged originally by the success of malarial therapy in congenital syphilitic children, he had extended its use to non-syphilitic brain-damaged defectives such as diplegics and athetotics. A course consisting of 8 to 12 pyrexial attacks was given to severely handicapped persons over the age of three years. Kundratitz was definitely of the opinion that such drastic treatment could lead to amelioration. The therapeutic note was also sounded by the next speaker, J. M. Tarlov (New York Medical College). Tarlov spoke of the place of surgery in such conditions as subdural hæmatoma before the onset of irreversible changes, craniostenosis, and epilepsy, but was frank about its limitations elsewhere. He gave it as his opinion that efforts to improve the cerebral blood flow by arteriovenous anastomosis rested on an unsound basis, and that no justification existed for removing normal tissue in the currently popular operation of hemispherectomy. E. P. Polani (Guy's Hospital, London) talked about recent work on chromosomal factors in some types of intellectual subnormality. He instanced mongolism with its 47 instead of the normal 46 chromosomes and thought that further research was likely to reveal a connection between chromosome anomalies and other forms of mental deficiency. The concluding paper of the afternoon was by S. Karelitz (New York State Medical School) and his colleagues. Karelitz referred to the significance of infants' vocalizations and amplified his talk with tape-recordings of the cry of normal and defective children. He thought more attention should be given to the cry as a diagnostic feature in the early detection of mental defect.

The final session took place with A. Minkowski, Director of the Centre de Recherches Biologiques Néonatales of Paris, as chairman. Lauretta Bender (State Department of Mental Hygiene, New York) outlined diagnostic and therapeutic aspects of childhood schizophrenia. She elaborated her concept of maturational lag at the embryonic level and described her method of classification. Differential diagnosis of childhood schizophrenia, autism and Heller's disease was the content of Clemens Benda's second paper. The question of differentiating between autism and mental defect only arose in severe cases of the latter. In Heller's disease, he stressed disappearance of speech as well as pathological features he had established at autopsy. The subsequent paper on the etiology and treatment of childhood psychoses, or to use the term preferred by the speaker, children with atypical development, was a presentation along psychoanalytical lines by P. H. Yates (Children's Center, Boston). Mental retardation as part of the training program in child psychiatry was taken up by G. E. Gardiner (Judge Baker Guidance Center, Boston). Initial training should be given during the regular medical course and consists of clinical demonstrations and didactic lectures, the latter in a well-organized sequence instead of scattered over various disciplines. Postgraduate training in child psychiatry should involve rotation of graduates at mental deficiency institutions. Asperger's second paper, describing types of behaviour problems occurring in brain-damaged children, concluded the scientific part of the session. The activities wound up with a report from the steering committee on future plans and decisions. It was decided to publish the proceedings, Vienna was chosen as the site of the next conference in 1961, and Dr. Kundratitz was elected the new chairman.

In addition to a fairly heavy schedule of lectures there were the usual scientific and commercial exhibits and films. Noteworthy was the carefully arranged social program for the ladies. Monday afternoon was given over to a garden tour, and Tuesday afternoon witnessed a conducted tour through the Portland Art Museum and the historic Sweat Mansion. On Wednesday afternoon the York County Medical Auxiliary acted as hosts and took their guests on a tour of the Maine coastline from Cape Porpoise to York. Wednesday evening was reserved for a sunset cruise and lobster dinner on Casco Bay and this time the delegates also took part. Alas! No one ever saw that sunset in the blanket of fog which so unkindly descended. Nevertheless the clambake was a success and quite a few succeeded in gingerly dismembering their first lobster. Next afternoon the ladies toured Greater Portland and Cape Elizabeth and visited the home of Miss Bette Davis. In the evening the popular actress was herself guest at a dinner attended by the speakers and organizers of the conference.

The First International Medical Conference on Mental Retardation was undoubtedly a success. It brought together workers from different branches interested in the medical aspects of mental deficiency. Biochemists, pædiatricians, psychiatrists, neurologists and others presented their views, each from his own angle. Individual papers on the whole tended to be outlines of recent knowledge rather than presentations of entirely new material, and although not all had equal application to the problems of mental deficiency the cumulative effect was stimulating. The emphasis on biochemistry, which had likewise been apparent at a meeting earlier in the year of the American Association on Mental Deficiency, underlined the rapidly increasing importance of this approach. Another advantage was the exchange of views by workers from different countries. North America and Western Europe were well represented, and Asia too had its observers. The major area not represented was the U.S.S.R., whose workers like Luria and Byckov are active in the field. It was all the more surprising, since official delegates were present from neighbouring Poland.

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WORLD MEDICAL ASSOCIATION

CONFERENCE ON COMMUNICATIONS

It has become traditional to begin the Assembly of the World Medical Association with a Medical Editors' Meeting, and this year the basis of the meeting was broadened to include representatives of other media of communications in medicine. In a three-hour session on Monday afternoon, September 7, in the Queen Elizabeth Hotel, the editors and the proponents of audio-visual aids extolled their wares and occasionally decried those of their rivals. However, after a long and stimulating session, they agreed that the editor, the publisher and the printer must work side by side with the radio and television experts and the film-makers.

The chairman of the session was Dr. S. S. B. Gilder, editor of the *Canadian Medical Association Journal*, and in opening the session and welcoming the participants he said that in the past 10 years or so the medical editors had wrung their subject pretty well dry. Moreover, there were persons going about, particularly in the United States, saying that the printed word had had its day and would be superseded by modern audio-visual methods of communication. The object of the afternoon's conference, he said, was to see more clearly what the respective roles of the editor and the others were in the field of medical communications. He referred to a German survey which showed that medical practitioners obtained 70% of their postgraduate education by reading and 30% by audio-visual methods, pointing out that the practitioners said that they would like to see these figures reversed. If they had their way, there might be a shrinkage in the number and volume of general medical journals.

The opening two papers were given by medical editors. The first was by Dr. Joseph Garland, editor of the *New England Journal of Medicine*, who gave a scholarly address entitled "Editor Resartus". He traced in broad outline the history of human communications, saying that as man had tried to improve his methods of communication he had often perversely succeeded only in making them more elaborate. As a defence against this over-elaboration he had fallen into the pit of over-abbreviation. There was a constant need for keeping our lines of communication not only intact but reasonably intelligible. Turning to the newer audio-visual media, he said that there was no real conflict between these and the system of printing, for the former were distinguished chiefly by "the sheer practicality of the material that lent itself to diffusion by their methods, by the pertinacity of those addicted to its diffusion, and by the endurance of the audience subjected to its influence". The printed literature of medicine remained the indispensable archive of its progress as well as of its philosophy. He was convinced that the relative effort of acquiring not merely casual information and practical instruction, but basic knowledge from reading had positive virtues compared with the lecture, the broadcast, the tape-recording, the film or the television program. It was the difference between being tube-fed and cutting up one's own meat; between going after something that required mastication or having it piped in like a nutrient enema. The electrically transmitted audio-visual message was possibly the easiest way of receiving information and probably the least effective way of ensuring its retention. The two basic virtues of the printed word were its relative permanence and its ready availability. The electrically transcribed methods of communication had little part in recording major contributions to medical progress, their legitimate part being rather that of postgraduate education, practical instruction in the everyday pursuit of the art of medicine, and instantaneous reporting in several tongues.

Dr. Roma Amyot, editor of *L'Union Médicale*, then read a paper entitled "Les œuvres écrites et le journalisme en médecine". He began by analyzing the motives behind human communication and then briefly surveyed the history of medical writing through the ages. He observed that journalism had begun with notaries, who gradually assumed the function of preparing letters containing news for their well-to-do clients. He said that nowadays the medical press was almost as voluminous as the daily press and the periodicals of popular literature. He pointed out that a general medical journal must contain a great variety of material, with the aridity of the scientific material relieved by other items such as articles on medical history or on para-medical subjects. As regards the newer means of communication, the speaker suggested that they should be applied to the health education of the public, graduate and postgraduate instruction and the illustration of certain techniques. Radio, television and films introduced an element of passivity which eliminated the efforts at reflection and concentration accompanying reading. This passivity meant that the producers of such programs tended to make them superficial rather than profound. Furthermore, audio-visual communications were fleeting and not calculated to induce thinking. In fact, medical thinking would be in danger of atrophy if, at some future date, books were replaced by tape-recordings, television screens and film libraries.

The next two papers dealt with the spoken word. Dr. Frank M. Woolsey, Jr., Associate Dean of Albany Medical College of Union University, Albany, N.Y., described in considerable detail his four years of experience with a new method of postgraduate education, namely two-way radio conferences between medical school personnel and doctors in peripheral hospitals. He suggested that some of his listeners might consider setting up a similar arrangement in their area, for he and his colleagues had been very satisfied with the effectiveness and practical value of the two-way conference. He emphasized that he was not speaking of ordinary radio broadcasting, but of weekly conferences in which the program originated in a studio in the medical school and could be heard by any physician or group of physicians within 50,000 square miles. The weekly program was listened to in a number of hospitals within broadcasting range, and anyone listening to the radio station could hear not only what was said in the studio but what was said in reply by hospital staff from other hospitals. Radio conferences were conducted from 12 noon until 1 p.m., and opened by two or more faculty members who reviewed a topic for not more than 20 minutes. The hospital groups then asked the panel questions; recently the programs had been strengthened by inclusion of faculty members from other universities such as Harvard and Boston University. Results had been very satisfactory, for participation from practising physicians was much greater than with previous

methods. Costs were also reasonable, for such a system could be put into action with an average expenditure equivalent to $2500 per participating hospital.

Dr. R. A. L. Macbeth, Associate Professor of Surgery, University of Alberta, then read a critical and thought-provoking paper on the place of tape-recordings in medical communications. He began by describing Terlouw's classification of the fundamental principles of communication. These include: (1) isolation or elimination of "noise", i.e. any extraneous visual, auditory or other stimulus not directly related to the teaching message; (2) preservation of the pupil-teacher relationship; (3) adequate intensity of stimulus; (4) sensory saturation with capture and retention by the lecturer of all sensory perception; (5) involvement. The capacity of an audience for passive absorption of information is limited, and the successful speaker must challenge his audience to become involved in the message. Tape-recordings have four major theoretical disadvantages: (1) "noise" often detracts from reception with available machines; (2) the pupil-teacher relationship is difficult to maintain; (3) sensory saturation is not achieved; (4) involvement is more difficult to obtain. The speaker pointed out that he was judging tape-recordings in comparison with a theoretically perfect medium of communication, and that the printed word also failed on at least three of the five points. Outlining his views on the use of tape-recordings, he first suggested that they were valuable to educate the educator, who could listen to his own presentations and obtain valuable suggestions for self-improvement. Secondly, tape-recordings might be used in connection with lectures and conferences to bring a dramatic situation before the audience. Tape was an extremely valuable storage medium for auditory stimuli which could not be reproduced on demand and had, of course, the advantages of being not greatly expensive, not requiring highly trained personnel and being always readily available in medical schools. The speaker then described tape subscription services, commenting on the scarcity of good analytical articles on their value in comparison with the many papers published on reading. He recalled that, in the adult, reading comprehension excelled listening comprehension for immediate recall, but only over a limited period; moreover, the greater the difficulty of the material presented or the higher the intelligence of the subject, the greater the superiority of reading comprehension. However, although theoretically learning by tape was inferior to learning by reading, the material available on tape was highly selective and did not suffer from the ever increasing journalistic menace of increasing quantity and decreasing quality. In discussion of these two papers Dr. Shapiro (Editor of the *South African Cancer Bulletin*) commented that two-way radio presentations were based on writing in the first place and that audio-visual aids provided for the lowest common denominator in the audience. He noted that *Excerpta Medica* were starting a new medical journal on long-playing records. He also complained about the dictated manuscript with its loose presentation and construction, while Dr. T. Primrose (Montreal) lamented the lack of vigorous editing of many English medical manuscripts, and even of French manuscripts.

Mr. Graeme Fraser, Vice-President, Crawley Films Limited, Ottawa, then gave a stimulating talk on the making of medical films, entitling his talk "Medicine Goes to the Movies". He pointed out that this was now a visual world in which we lived and that Canadians turned out more motion pictures and filmlets than books and booklets combined. On any given evening, 55% of Canadians were watching television while only 17% spent some time in reading. He analyzed the impact of films on a teaching hospital in Ottawa, saying that not a day went by without the screening of some films in the building. He had also made four medical films in this hospital in the last year. In the United States, hospitals alone had 6300 motion picture projectors, while the American Medical Association loaned over 5000 films a year, mainly to medical schools and medical societies. In addition to undergraduate and postgraduate teaching, medical men were using films for recruitment and public education. The speaker would have liked to see more films produced for wide showing to the general public through television and at meetings of clubs and associations. No institution could long survive without the understanding and approval of the public, and laymen had much to learn about the medical profession. He thought that motion pictures had six main advantages in medicine: (1) guaranteed "readership"; (2) no competition from other stimuli; (3) impact; (4) retention; (5) long life-span of the message (five years on an average); (6) versatility. Finally, Mr. Fraser said that motion pictures must always remain a servant of the teacher. They could not replace the personal influence of either teacher or medical student.

In the final paper of the afternoon, Mr. Ralph P. Creer, Director of Medical Motion Pictures and Television, American Medical Association, discussed television as applied to medical education. He gave an instance of the resistance to newer methods by quoting the reply of a medical educator to a recent questionnaire: "I am unfamiliar with closed-circuit television and I hope to remain so." He noted that the increased use of television in recent years had not diminished the demand for medical films. There was a 186% increase in bookings from the A.M.A. Film Library during the last 10 years. He noted also that kinescopes (16-mm. film recordings of live telecasts) were made of some television programs and thus reached a larger audience. Results of studies indicated that for general classroom teaching television was in some cases as effective as conventional methods, though no such studies had actually been made in the medical schools. It might be well for medical teaching centres which had been using television to get together and discuss the advantages and disadvantages of the medium. He stressed the fact that maintenance of television equipment was an important factor often overlooked, and that television did not relieve the instructor of any of his responsibilities. The audience had a sense of immediacy which was not the case with motion pictures. Television made it possible for larger audiences to observe procedures and portions of anatomy usually observed by only one or two students, and it had also been used experimentally in visualizing endoscopic procedures. Dr. Ruhe had pointed out that television was a new method of improving the human power of sight, enabling man to expand his limited vision, to record and store images, and to project them as required. In radiology, image intensification plus television had become a standard diagnostic approach and photo-luminescent plates promised to bring fluoroscopy into broad day-

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light and to reduce radiation dose as well. Television equipment seemed to provide a unique medium for presentation of material in psychiatric interviewing, basic science demonstrations, various diagnostic methods and postgraduate education in general. In time of national emergency, medical television could be invaluable in linking together health personnel in various cities, and of course experimental transoceanic programs had already pointed up the possibilities of world-wide discussion of medical problems. Finally, Mr. Creer said that the American Medical Association was getting together a conference to discuss the value of the various teaching media.

Association Notes

AY! WE WILL COME BACK AGAIN*

MRS. MARY E. TISDALE, *Winnipeg, Man.*

"By crag and lonely moor she stands,
This Mother of half a world's great men
And out of the heart of her haunted land
She calls her children home again."

Edinburgh was like a dear old mother as she welcomed her children and her children's children. Her great heart throbbed in anticipation of their arrival. Her pipers, her soldiers and her Highland dancers were all arrayed in their finest kilts. Everyone, from the Lord Provost attired in robes of civic office, to the humblest citizen, extended a warm welcome. Canadians were honoured in having the Castle floodlit every night for added enjoyment. It stood above the darkened gardens like a white fairy castle suspended in mid-air.

Such was the environment which greeted the Canadian doctors and their wives while they were guests of the British Medical Association. The only honour denied them was that of having their name on the floral clock in Princes Street gardens. It seemed most fitting that "Her loved ploughman, he of Ayr" should have this honour; and his name bloomed in fragrant memory of his bicentenary. However, a special emblem was planted at the top of the Mound, a shield in rich red colour, with a large golden maple leaf and the letters B.M.A. It was symbolic of the warm relationship which prevailed at the joint meeting of the two medical associations.

This tribute, I am sure, is an expression of what is in the heart and mind of every Canadian wife or daughter who was a guest at that historic meeting in Edinburgh. The gracious, warm hospitality of our hostesses will long be remembered and is deeply appreciated. Our most sincere thanks seem quite inadequate in return, but we came home feeling that we had been greatly honoured by their kindness in planning so many delightful events for our entertainment.

A program of variety and interest made selection difficult and all to be crowded into one short week. The major social gatherings, of course, were for husbands and wives, such as dinners, the symphony concert, the garden party at Holyrood and the military display on the esplanade of the Castle. But while our husbands were absorbed in scientific meetings we were certainly not left at a loose end.

There were tours to castles in the Highlands, visits to historic houses, a fashion show, coffee parties and golf, and visits to factories of unusual interest. These were only a few of the items on the ladies' program.

The Assembly Club was the central meeting place for registration, social gatherings, luncheons and teas. Here, the women's committee functioned at top speed; not a question was left unanswered, nor was there a wish that was not fulfilled. As the Canadian women registered, each was presented with a sterling silver pin set with that native Scottish stone, the cairngorm. This efficiency and friendly environment were enhanced by the beauty which abounded everywhere. At the entrance and in each room lovely floral arrangements gladdened the eye. One immediately felt that an artist had been at work and it was revealed that the convener of the floral committee was truly a genius with flowers. She was a spritely little lady, a doctor's wife, who had just returned from Paris where she had won several awards for her arrangements at the annual flower show. But she is a gardener as well and had been planning this convention months ahead. Regal lilies had been planted to bloom for this special occasion. Each morning, her face beaming, she came in with baskets full of fresh flowers to replenish the many bouquets; hence they retained their beauty throughout the week. This contribution was one of the delights we will remember and we gratefully thank those who contributed and arranged these bounties of nature.

On a beautiful Sunday afternoon, St. Giles Cathedral, that historic place of worship, opened its portals for the Thanksgiving service. What reverent dignity prevailed as the colourful procession entered the west door, solemnly bearing the banner of the British Medical Association to the sanctuary where it was laid on the Holy table. A Scottish voice besought a blessing for those assembled and on the work of ministering to the sick. Voices rose in splendour through the hallowed walls singing that beautiful psalm, "All people that on earth do dwell, sing to the Lord with cheerful voice". Dr. Whitely, minister of St. Giles, delivered a message which was deeply moving. He paid great tribute to the pioneers in the medical profession and delivered an inspiring challenge to those who are following them in ever widening fields of service.

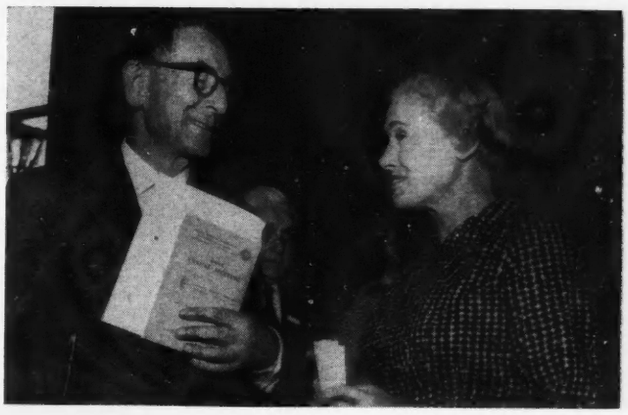
Sunday evening we experienced Scottish hospitality at its best when we were guests in the homes of Edinburgh doctors and their wives. Here we met old friends and new. After these pleasant supper parties, most guests were entertained at the special concert provided by the B.B.C. Scottish Orchestra which was conducted by Dr. Ian White.

The charming scenery of rural Scotland has always been attractive to visitors, and the well-chosen tours were extremely popular, especially those to such historic places as Melrose and Dryburgh abbies, Loch Lomond, Stirling, Ayr, and Abbotsford. The visits were rewarding, for these places are all steeped in Scottish history, such as Abbotsford, where Sir Walter Scott spent his literary life, and Dryburgh Abbey, his

(Continued on page 596)

*This article appears by kind permission of the *Manitoba Medical Review.*

Five distinguished men of medicine chat together at the joint meeting of the British Medical Association and the Canadian Medical Association held in Edinburgh in July. Left to right: Professor Sir Arthur P. Thomson, Dean of the Medical Faculty at Birmingham University and President of the B.M.A.; Dr. Wilder G. Penfield, O.M., Director of the Montreal Neurological Institute; Lord Adrian, O.M., Master of Trinity College, Cambridge, and Vice-Chancellor of Cambridge University; Dr. E. Kirk Lyon, Leamington District Memorial Hospital and Deputy President of the C.M.A., who deputized for H.R.H. The Duke of Edinburgh; Dr. Solomon Wand, Birmingham, Chairman of Council of the B.M.A.



Widow of Sir Frederick Banting, co-discoverer of insulin, Dr. Henrietta E. Banting talks with Dr. William Boyd of Toronto. Dr. Boyd was a joint president of the Section of Pathology and Bacteriology of the combined organizations.

A lively Scottish reel at the Assembly Club. This was quite the most popular place in Edinburgh throughout the week, both with Canadian and British visitors.

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last resting place. This was a memorable afternoon and calls to mind the lines of Wilfred Campbell:

"Out where the miles of heather sweep
Her dust of legend in his breast
'Neath aged Dryburgh's aisle and keep
Her wizard Walter takes his rest."

The creation of beautiful things makes a strong appeal to most of us, and the visit to the Edinburgh Crystal Glass Factory was one interesting event we shall remember. Here we watched with fascination as skilled hands, with the simplest tools, turned out engraved and cut glass of exquisite beauty, much of which is exported to Canada.

Another factory open to us was Ballantyne's of Peebles. To add to the delight of this afternoon, we drove over the moors where there was no habitation for many miles, but picturesque scenes of shepherds with their dogs leisurely guarding the sheep, surely a suitable introduction to a woollen factory. Here we saw the making of those beautiful cashmere sweaters which are treasured in the Canadian girl's wardrobe. The new designs, which are not on the market as yet, will make them even more popular. We watched the deft fingers creating these garments with the utmost care, and the detailed inspection of each stitch makes them worthy of our greatest appreciation. The workers are all paid on a piecework basis; hence visitors do not attract much attention, as perfection seemed to be their aim.

The young folk were not forgotten in the social program. An all-day sail on the Firth of Clyde on a beautiful day was a perfect outing for the lads and lassies.

A fashion show erased any doubts we may have had about the styling of Scottish tweeds. The models were most attractive lassies, Sheena, Morag, Sheila and Kirsty, whose rosy cheeks enhanced the lovely heather colours in the garments they displayed. The reaction of the audience must have been most gratifying, but

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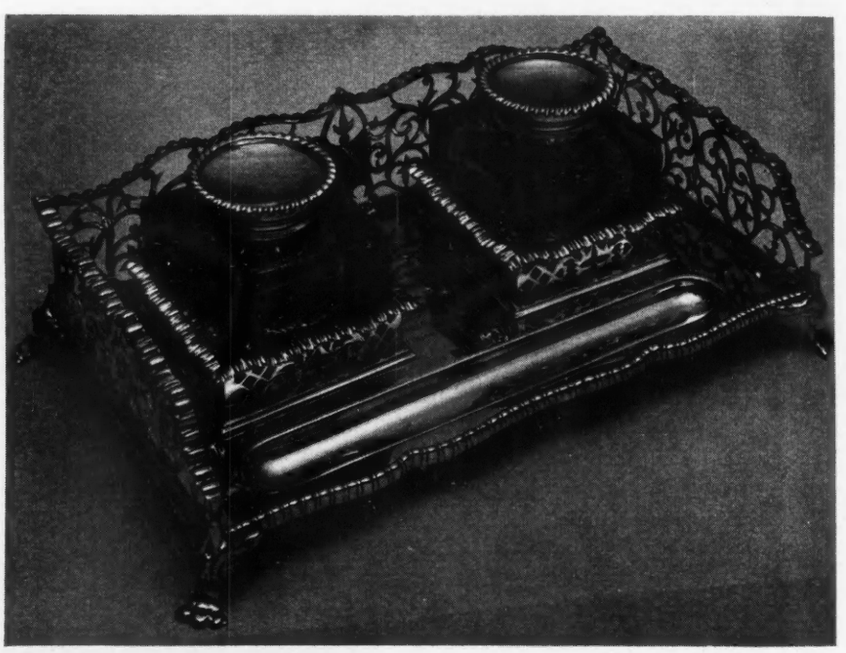
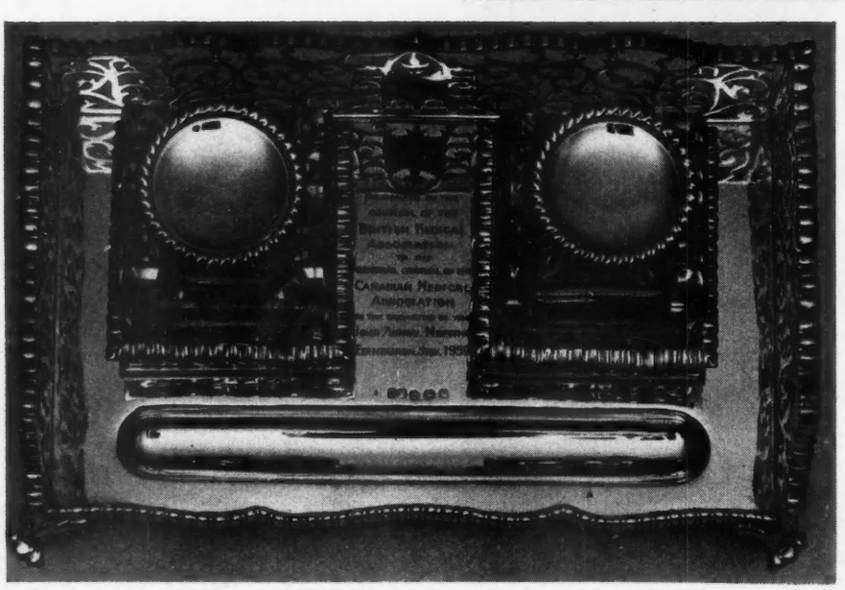
A feature of the Adjourned Annual General Meeting of the British Medical Association in Edinburgh on July 20 was the presentation by the Council of the B.M.A. to the General Council of the C.M.A. of a handsome antique inkwell set in sterling silver and glass. The presentation was made by Dr. S. Wand, Chairman of the B.M.A. Council, to Dr. Norman H. Gosse, Chairman of the C.M.A. General Council. The gift is inscribed as follows: "Presented by the Council of the British Medical Association to the General Council of The Canadian Medical Association on the occasion of the Joint Annual Meeting, Edinburgh, July 1959."

This memento of a memorable meeting will occupy an honoured place in C.M.A. House and will be used by the Chairman at meetings of the General Council.





with a sponsor by the name of Roderick Tweedie could it have been other than a success?

The week was climaxed by a farewell party for the overseas guests. The Assembly Club, still resplendent with flowers, was the setting for a delightful program. The champion Highland dancers of Scotland entertained us with strathspeys, reels and sword dances, all to the tune of the pipes. As we listened to the folk songs and Border ballads we felt we were truly a part of a Scottish family, instead of guests for one short week.

Where else but in Edinburgh would a great throng of every colour and race join hands and sing "Auld Lang Syne", and where but in Scotland would eyes be dimmed as we listened to the haunting lament of that old Scottish farewell, "Will ye no come back again?"

MEETING OF THE EXECUTIVE COMMITTEE IN MONTREAL

On the occasion of the 13th General Assembly of the World Medical Association the Executive Committee of the C.M.A. met in Montreal on Sunday, September 6, in the Queen Elizabeth Hotel.

Among the items of business arising from the previous meeting, a letter from Dr. P. E. Moore, Director of Indian and Northern Health Services, Department of National Health and Welfare, contained a long-awaited statement on Indian Health Services which had been sought by the C.M.A. Dr. Moore stated that the Directorate carries on its preventive and curative programs through the medium of several categories of physicians: (a) full-time medical officers, who are employed in remote areas which lack private practitioners, in departmental hospitals and regional and zone offices where they are concerned largely with organizational and administrative work; (b) part-time medical officers who are private physicians paid a salary for looking after the medical needs of the indigent Indians in their locality; (c) designated physicians, also private physicians, who are paid on a modified fee-for-service basis for their services to indigent Indians. Payment is made according to the Directorate's schedule of fees. In most areas where there is a sizeable Indian population, one physician or group of physicians has been designated by the Department to furnish emergency and essential medical attention to those Indians who look to Indian Health Services for assistance. When Indians consult physicians other than the designated physician in such areas except for referral or in emergency in his absence, they must do so as private patients and be responsible for their own accounts. In areas where there is not a designated physician, a full-time or part-time physician, occasional accounts are accepted on behalf of Indians who become ill while visiting there. This breakdown did not touch the chief cause of dissatisfaction in this field, which rests mainly with the identification of Indians entitled to medical care. It was resolved to formulate a comment on the above-mentioned statement and, with the approval of the Advisory Committee to Government, forward it to Dr. Moore.

As regards the Canada Shipping Act, it was pointed out that some mariners get medical service very cheaply although it would certainly be within their means to afford medical care at standard rates. This service seems extended well beyond those for whom it was generally conceived, and in certain parts of the country it contributes to the overcrowding of D.V.A. hospitals. The party responsible for settling the accounts (sick mariners' fund or compensation boards) is at times not too clearly identified. The covering of personnel of foreign ships only would considerably simplify the matter. It was moved that the General Secretary should contact Mr. W. H. Frost, Chief of Quarantine, Immigration and Sick Mariners Services, for the purpose of clarifying the matter.

The challenge set by our President on the occasion of his installation brought to light the preliminary activity of the Committee on Public Health in matters pertaining to physical fitness. After a fair amount of discussion it was pointed out that physical fitness of the athlete should not be confused with the degree of optimum health which the majority of the population should enjoy as a reasonable assurance of longevity. It was resolved that the Committee on Public Health should study this matter in the light of the present discussion and submit further recommendations.

Hope was expressed that the committee appointed by the chair to deal with the membership fee structure of the C.M.A. would report during November, as decisions taken must be implemented for the 1960 membership year starting on January 1.

The Executive Committee decided to assist the production of Mediscope '59 by a contribution of $5700. This unique venture in public relations will take place in Toronto on October 12-17 under the sponsorship of the Ontario Division.

In the section of the agenda devoted to meetings, the secretariat was congratulated for the part it played in arranging the highly successful tripartite general meeting this year. The two representatives of the C.M.A. to the British Commonwealth Medical Conference expressed their satisfaction at having attended this meeting and said that the C.M.A. should continue to support this international organization which in many respects resembles a family gathering. The diversities of language which handicap communication in larger international bodies are not present, although the medical problems of the nations represented are sufficiently varied to make the conference a very representative one. The Association will make a contribution of £800 every two years towards the cost of convening the conference. The program for the C.M.A.'s 93rd annual meeting (1960) will not include any television. There will be three panels on three different mornings as part of the scientific session. The possibility of having the President attend this meeting was discussed.

The Editor reported on the progress of the Journal and on the selection of a second Assistant Editor in view of the weekly publication starting in January 1960. The medical section of the Canadian Pharmaceutical Manufacturers Association had applied for affiliation with the C.M.A. This application was looked upon favourably by the Executive Committee and is to be put before the General Council next year, for approval.

The Deputy to the President and the Chairman of Council, with the General Secretary as alternate, were nominated as representatives of the C.M.A. at the

installation of His Royal Highness, the Prince Philip, as President of the B.M.A. in London on October 28, 1959.

The Executive Committee of the C.M.A. had been invited by the Manitoba and British Columbia Divisions to meet in these two provinces at some future date. Considering that Toronto is probably the most central place in Canada for such meetings and that meetings outside C.M.A. House involve the transportation of an ever increasing number of officials, it was decided that the Executive Committee would meet outside Toronto only on the following two occasions: when a special event is being celebrated or when a particular problem calls for special advice to be given immediately.

Among the items of new business the report of a meeting of T.C.M.P. administrators to discuss civil service coverage loomed large in the discussion. In the recent submission for coverage of the Federal Civil Service, the specifications set by the Government were such that T.C.M.P. could not conform. The committee of Plan Administrators of T.C.M.P. recommended that an appeal to the Minister be made in order that the plans might participate. The Executive Committee approved a letter which was to be sent on September 8, 1959, by Mr. Major to the Minister of Finance on behalf of T.C.M.P. member plans concerning a submission for coverage of the Federal Civil Service.

A report on preliminary consideration of a Canadian Health Insurance Council was received for information and will be discussed at a further meeting of the Executive Committee.

The representative from Saskatchewan expressed his dissatisfaction with the present scheme of sickness and accident insurance of the members of his division. In wanting to set up its own non-profit insurance company the Saskatchewan division wished to enlist the help of the C.M.A. but the representative was informed that the C.M.A. could not legally provide assistance.

Support was given to a request by the Fleming Memorial Fund for Medical Research to use the C.M.A.'s name among its patrons. An item dealing with the National Disease and Therapeutic Index was accepted for information.

In the course of the meeting the Executive Committee was given a chance to see the three one-minute filmets produced on behalf of the Public Relations Committee and currently being used in 50 television stations across the country.

The next meeting of the Executive Committee is to be held in Toronto on November 13 and 14, 1959.

THE CANADIAN MEDICAL RETIREMENT SAVINGS PLAN

Contributions to C.M.R.S.P. during the second quarter of 1959 totalled $313,626. Of this amount, $99,519 was allocated to the insured annuity fund and $214,107 was allocated to the common stock fund.

On a cumulative basis, total contributions to C.M.R.S.P. since its inception are $4,928,366. Of this amount, $1,798,603 has been allocated to the insured annuity fund and $3,129,763 allocated to the common stock fund.

The Common Stock Fund

On August 31, 1959, the value of each unit in the common stock fund was $13.002, a slight decrease from the $13.025 valuation on May 31. This slight decrease was due to a sharp fall in the values of common stocks from a high reached during the first ten days in August. It illustrates very effectively one facet of our program which we have always stressed—that the value of stocks can go down as well as go up.

During the last quarter, common stocks of 47 companies were purchased. Seven new names were added to our list. These are Banque Canadienne Nationale, General Motors, Woodward Stores, Goodyear Tire & Rubber, Minneapolis-Honeywell, Hudson Bay Oil & Gas, and Alberta Gas Trunk Line. Four holdings were liquidated—1200 shares Bank of Nova Scotia, 850 shares Industrial Acceptance, 1000 shares Zellers Ltd. and 800 shares Gatineau Power. In addition we sold 250 shares of Ford Motor Company of Canada Class "A", 60 shares Manufacturers Life Insurance Company, and 600 shares Bell Telephone Company of Canada.

COMMON STOCK FUND

Valuation of Assets at August 31, 1959
(U.S. stocks valued at equivalent Canadian price)

No. of Shares	*Description*	*August 31, 1959, Value*
	Automotive:	
250	Ford Motor Co. of Canada Class "A"	$ 43,250.00
900	General Motors	49,392.00
	Banks:	
2500	Bank of Montreal	143,125.00
1500	Banque Canadienne Nationale	84,000.00
2000	Canadian Bank of Commerce	119,500.00
1500	Royal Bank of Canada	126,000.00
1400	Toronto-Dominion Bank	84,000.00
	Beverages:	
1400	Hiram Walker Gooderham & Worts	52,150.00
1700	Canadian Breweries Ltd.	66,512.50
2500	Molson's Brewery Class "A"	68,125.00
	Building Products:	
1000	Building Products Ltd.	36,000.00
1750	Canada Cement	57,531.25
	Chemicals:	
1500	Canadian Industries Limited	26,625.00
950	Dow Chemical	76,551.00
300	E. I. Dupont de Nemours	76,701.00
	Electrical:	
500	Canadian Westinghouse	23,500.00
1200	General Electric	93,408.00
	Insurance:	
360	Confederation Life Assn.	59,940.00
180	Manufacturers Life Insurance Co.	45,000.00
325	Insurance Co. of North America	40,618.50
	Iron and Steel:	
1500	Algoma Steel Corp	59,250.00
1100	Steel Co. of Canada Ltd.	90,200.00
	Merchandising:	
2400	Loblaw Companies "A"	72,000.00
2700	Simpsons Ltd.	95,175.00
2500	Woodward Stores Ltd. "A"	47,500.00
	Metals:	
1050	Asbestos Corporation	33,600.00
900	Aluminium Ltd.	29,250.00
1700	Hollinger Consolidated Gold Mines Ltd.	54,400.00
500	International Nickel	47,625.00
1000	Consolidated Mining and Smelting	19,875.00

	Miscellaneous:	
2000	Dominion Tar and Chemical	36,000.00
350	International Business Machines Co.	141,389.50
3000	Moore Corporation	126,000.00
700	Owens Illinois Glass	64,820.00
150	Goodyear Tire and Rubber Co. of Canada	28,500.00
200	Minneapolis-Honeywell Regulator Co.	24,948.00
1000	Page-Hersey Tubes	30,375.00
	Petroleum:	
1400	British American Oil	51,625.00
1100	Imperial Oil Ltd.	42,075.00
600	Texaco Canada Ltd.	40,350.00
1100	Standard Oil of New Jersey	53,944.00
1000	Hudson Bay Oil and Gas	16,750.00
	Pulp and Paper:	
1500	Consolidated Paper	58,125.00
1100	Great Lakes Paper	44,275.00
1000	Howard Smith	44,000.00
1200	Powell River Co.	41,700.00
1500	St. Lawrence Corp. Ltd.	24,000.00
	Pipelines:	
1200	Interprovincial Pipe Lines	65,250.00
1300	Trans Canada Pipe Lines Ltd.	34,450.00
700	Alberta Gas Trunk Line	18,900.00
	Public Utilities:—Electric	
700	Calgary Power	64,662.50
3500	Shawinigan Water and Power	105,875.00
600	British Columbia Power Co.	21,600.00
	Gas Distribution:	
2500	Consumers Gas Co.	108,125.00
4000	Union Gas Co. of Canada	71,000.00
	Telephone:	
1750	Bell Telephone Co. of Canada	73,062.50
	TOTAL INVESTMENTS	$3,352,605.75

Market Valuation of Fund and Unit

Market Value of Investments	$3,352,605.75
Add:	
Accrued Income— (Dividends declared but unpaid)	8,743.00
Cash on Deposit—at Interest	3,608.41
	$3,364,957.16
Less:	
Administration Fee (1/8 of 1% of above)	4,206.20
Market Value of Fund as at August 31, 1959	$3,360,750.96
Units outstanding	258,476.03
Market Value per Unit	$13.002

On the basis of 258,476.03 outstanding units, the unit value is $13.002. Contributions made to the common stock fund during the three months prior to August 31 purchased units at this rate.

Trusteeship Committee

On September 19 the Trusteeship Committee met with the officials of The Royal Trust Company to establish policy with respect to investments during the subsequent three months. Approximately $225,000 was available for investment—$200,000 from second quarter contributions and $25,000 income. A very selective program of purchases was approved for investment in long-term growth stocks and in some defensive securities.

Notice to Non-Participants

If you wish to obtain more information about C.M.R.S.P. please write to the Association office at 150 St. George Street, Toronto 5. Brochures and other informative literature are available on request. The basic outline of C.M.R.S.P. is simple and extremely flexible, and participation will enable you to obtain tax relief now on savings which you invest to provide retirement income.

PUBLIC HEALTH

ADDITIONS TO PRESCRIPTION DRUGS

For the last two years or more the Committee on Pharmacy of the Canadian Medical Association has been urging that the so-called "tranquillizers" should be available only on prescription. The Prescription Drug Subcommittee of the Canadian Drug Advisory Committee, which consists of one representative recommended by the Canadian Medical Association and one representative recommended by the Canadian Pharmaceutical Association, with the Director of the Food and Drug Directorate of the Department of National Health and Welfare as chairman, has accordingly recommended a revision of Schedule F of the Food and Drugs Act to incorporate this proposal.

As of July 30, 1959, 32 drugs have been added to Schedule F, many of these being tranquillizers or ataractics. These drugs must now be sold only on prescription, and a prescription may not be refilled unless the medical practitioner so directs and specifies the number of times that it may be refilled.

Part I of the Schedule contains nine additions of which six are considered to be hypnotics, while the other three are stimulants. The drugs added are: ethchlorvynol, ethinamate, ethyl trichloramate, imipramine and its salts, methylparafynol, methylphenidate and its salts, methyprylon, nialamide and its salts and phenelzine and its salts. All the additions made to Part II of Schedule F come within the loose description of tranquillizer except griseofulvin, the new fungicidal antibiotic; phenformin, the new oral anti-diabetic drug; and oil of apiol, an old drug which has been misused by the public. The list includes all the well-known tranquillizers, such as meprobamate, rauwolfia and its derivatives, diphenylmethane derivatives such as azacyclonol, and the phenothiazines such as perphenazine and mepazine.

SURVEILLANCE REPORTS OF EPIDEMIC OR UNUSUAL COMMUNICABLE DISEASES IN CANADA

PARALYTIC POLIOMYELITIS

CANADA—For the week ending August 22, 1959, a total of 102 cases of paralytic poliomyelitis was reported to the Epidemiology Division, Department of National Health and Welfare. This is the first time since week 28 (ending July 18) that no appreciable increase is noted in the weekly reporting. The levelling of the number of cases reported applies to all provinces including Quebec and Newfoundland.

The cumulative total for 1959 stands at 455 paralytic poliomyelitis cases. On the following page are the figures for week 33 and the cumulative totals, to this date, since 1949.

The number of cases of paralytic poliomyelitis reported this week and the cumulative total for 1959 have been exceeded only in 1949 and 1953.

Thanks to the co-operation of the respective provincial health departments, a comparative analysis by age group is presented of the paralytic poliomyelitis cases reported in the provinces of higher incidence—Quebec, Newfoundland and Ontario.

The Virus Laboratory of the Institute of Microbiology, University of Montreal has isolated so far: 58 poliovirus type I, two type II, two type III and five Coxsackie B5 virus. One of the Coxsackie isolations was made in a paralytic case.

PARALYTIC POLIOMYELITIS: FIGURES FOR WEEK 33 (ENDING AUGUST 22), 1959, AND CUMULATIVE TOTALS, 1949-1959

Year	*1949*	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*
Week 33....	*128*	28	82	71	*268*	55	40	24	9	9	*102*
Cumulative total.....	*499*	143	315	369	*1143*	379	248	109	73	64	*455*

PARALYTIC POLIOMYELITIS: PERCENTAGE DISTRIBUTION BY AGE GROUP—QUEBEC,* NEWFOUNDLAND, AND ONTARIO TO AUGUST 22, 1959

	*Quebec**		*Newfoundland*		*Ontario*	
Age group	*Cases*	*% total*	*Cases*	*% total*	*Cases*	*% total*
Under 1.....	4	1.0	7	15.0	3	8.0
0 - 4.....	89	29.0	33	70.2	15	41.6
5 - 9.....	107	35.0	12	25.5	8	22.2
10 - 14.....	42	13.7	—	—	—	—
15 - 19.....	17	5.6	2	4.3	—	—
20+.....	51	16.7	—	—	13	36.2
Total.....	306	100.0	47	100.0	36	100.0
Fatality rate.....	9.0%		4.3%		8.3%	
Bulbar rate.....	25.0%		36.0%		Not available	

*Cases from the province of Quebec treated in Montreal hospitals.
Total for province—326.

PARALYTIC POLIOMYELITIS CASES ADMITTED TO MONTREAL HOSPITALS BY WEEK OF REPORTING, 1959

Week	*27*	*28*	*29*	*30*	*31*	*32*	*33*	
Week ending	*Total to July 11*	*July 18*	*July 25*	*Aug. 1*	*Aug. 8*	*Aug. 15*	*Aug. 22*	*Total*
From								
Montreal.....	5	3	8	23	26	34	30	129
Metropolitan area.....	4	2	4	6	16	13	15	60
Outside metropolitan area.....	9	4	4	16	15	37	32	117
Total.....	18	9	16	45	57	84	77	306

CONJUNCTIVITIS

Since June 15, 1959, 23 cases of conjunctivitis have occurred at Goose Bay, Labrador. Thirteen of these were in children, seven of whom also had pharyngitis. Ten of the cases were in adults, four of whom in addition to conjunctivitis had iritis and one who had otitis media. Three of the adults with iritis were admitted to hospital. Six of the adults were service personnel.

RUBEOLA

Two hundred cases of rubeola have been reported from Queens County, Nova Scotia. The outbreak started in June.

ROCKY MOUNTAIN SPOTTED FEVER

During the first week of August, a case of Rocky Mountain spotted fever was reported in a 36-year-old man from Calgary, Alberta.

TULARÆMIA

A 60-year-old man in the Lac La Biche area in Alberta was bitten by a mink and was admitted to hospital on July 22, with a diagnosis of tularæmia.

August 22, 1959.

Epidemiology Division,
Department of National Health
and Welfare, Ottawa

PARALYTIC POLIOMYELITIS IN CANADA*
34TH WEEK—ENDING AUGUST 29, 1959

	Reported cases					*Deaths*	
	1959			*1958*		*1959*	*1958*
	This week	*Last week*	*To this date*	*This week*	*To this date*	*To this date*	*To this date*
Canada.....	110	107	571	16	80	48	9
Newfoundland.....	12	5	60		3	4	
Prince Edward Island.....	1		1				
Nova Scotia.....							
New Brunswick.....	8		16		1	2	1
Quebec.....	76	90	406	5	20	34	
Ontario.....	1	4	38	1	6	3	3
Manitoba.....		2	7	9	31		2
Saskatchewan.....	5	1	13				
Alberta.....	2	3	12	1	11	1	1
British Columbia.....	5	1	7		8		2
Yukon.....		1	1				
Northwest Territories.....			10			4	

*Weekly returns based on telegraphic reports by provinces.

LETTERS TO THE EDITOR

CERTIFICATION IN ORTHOPÆDICS

To the Editor:

In the past year the Council of The Royal College of Physicians and Surgeons of Canada has continued to review policy with respect to the Certification examinations of The Royal College. Some months ago particular attention was paid to the status of the Certification examination in Orthopædic Surgery, this being stimulated particularly by a communication from the Canadian Orthopædic Society urging that The Royal College give consideration to the discontinuation of the Certification examination in Orthopædic Surgery.

The Council approved a resolution to the effect that the Certification examination in Orthopædic Surgery should be discontinued in the year 1964. In that year, and thereafter, Certification in Orthopædic Surgery will be granted by The Royal College only on the basis of success at the Fellowship examination in Surgery modified for Orthopædic Surgery. While the Certification examination will be discontinued, the Certificate will still be issued but only to those who are successful at the Fellowship examination.

150 Metcalfe Street,
Ottawa 4, Ontario,
August 25, 1959.

JAMES H. GRAHAM,
F.R.C.P.[C], Secretary,
The Royal College of
Physicians and Surgeons
of Canada.

CHILD GROWTH

To the Editor:

To survive, the organism must successfully adapt to its environment. Quite commonly the environment which most hastens growth is accepted as the best environment for the organism under scrutiny.

During the past 30 years, Saskatoon school children between 1936 and 1946 increased mostly in height, between 1946 and 1956, markedly in height and weight. Similar observations are reported in the U.S.A. and Great Britain. The increased speed of growth of body has been accompanied, as would be expected, by an increased mental age, sexual age, and visual age.

Probably these increases have been occurring as the amount of physical (muscular) exercise taken by the child has declined in amount. Possibly (we have no evidence) today's youth cannot perform muscularly, and are physically suffering "sub-health" to a greater extent than children of former generations. But is this important? Canada needs citizens whose capacities are measured in terms not of muscular fitness but of mental and emotional fitness. Even the labourer of yesterday must today be capable of training in the use of the machine. The point is, we have much evidence that an improvement in child environment has been continuously occurring in this century, and we have no evidence whatever that greater emphasis on muscular exercise would improve child growth. Indeed, most healthy children from a healthy emotional environment will themselves exercise at their own pace and time as needed.

I would emphasize one aspect of child growth much more important than muscular fitness. Today's child attains puberty, with its emotional characteristics, at least three and probably four years earlier than in 1929. Among the species, only man enjoys years of childhood, years made for training. But during this century these years have lessened by 20% or so, and life span has increased in similar amount. No longer do we adults have one-fifth of a life span to train children for our increasingly complex civilization and its problems. If children in 1929 could enter school at 6 years, today they, at 5 years with the same capacities of the 1929 6-year-olds, should enter school at 5. If in 1929 the youth of 18 was ready for life with Grade XII, today that youth is physically, sexually and emotionally a 21-year-old. Yet during the past three decades the community has tended to treat youth as being younger, not older as is the case, than formerly. Our main problem in child-raising centres around the fact that the family, the school and the community have not recognized the implications in faster-growing speed of body, have not recognized that the child is a biological entity in which as body grows faster, so does the mind. Let us, therefore, in this age in which as physicians we have been exposed to psychosomatic medicine and are turning to somato-psychic medicine again, recognize at least the basic implications of what our good work for body has accomplished in child growth, and as an Association insist it be made use of for the welfare of our children.

211-4th Ave. South,
Saskatoon, Sask.,
August 18, 1959.

GRIFFITH BINNING, M.D.,
Medical Director,
Saskatoon Public Schools.

NICOTINIC ACID AND NICOTINAMIDE IN RHEUMATISM

To the Editor:

I have read with great interest Dr. A. Hoffer's recent article on the treatment of arthritis using nicotinic acid and nicotinamide (*Canad. M. A. J.*, 81: 235, 1959). Having no experience with this drug in arthritic patients, I do not wish to deprecate its potential value. I do feel, however, that a few points of interest should be commented upon.

1. The vagaries of the clinical course of rheumatic disease are such that the difficulties in assessing any therapeutic agent are well known to everyone with an interest in these illnesses. A double-blind study is almost the only way of obtaining factual information about any agent used. In view of Dr. William Kaufman's extensive experience with niacinamide, I wonder if such a controlled study might not have made more impression on "leading rheumatologists, nutritionists and gerontologists".

2. Case 5 would seem to be an excellent example of the placebo qualities of nicotinic acid in a patient with "nervous arthritis" and illustrates the danger of an uncontrolled study. (I do not mean to imply criticism of Dr. Hoffer's study, which is not claimed to be controlled.)

3. Arthritis not being a disease but rather a group of diverse entities affecting joints, the suggestion that these drugs are of value in almost all forms of arthritis

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varying from psychogenic rheumatism to rheumatoid arthritis, osteoarthritis and possibly gout, should cast suspicion on their potentialities. I am unaware of any drug with such potentialities available to present-day practitioners. Even the much used and abused adrenal steroids are ineffective in psychogenic rheumatism.

4. As the drug manufacturers are now given renewed impetus and as many physicians now are likely to try these drugs, prior to the "adequate therapeutic trials" suggested by Dr. Hoffer, I can only agree with him that such a study is certainly warranted, assuming of course that the drugs have not already been found lacking in efficacy.

GERALD E. SINCLAIR, M.D.

612 Medical & Dental Building,
Regina, Sask.,
August 27, 1959.

X-RAY REPORTS

To the Editor:

One of my present endeavours is to collect documentation on x-ray reports, i.e., those somewhat ephemeral texts in which the roentgenologist lists and interprets the findings elicited during diagnostic (fluoroscopic and/or roentgenographic) examinations.

Since literature on this topic is relatively scarce, bibliographic indications (perhaps reprints) in any language would be of help. Quotable sentences on what should, or on what should not, be included in x-ray reports, are also invited. Most of all, the undersigned would like to receive originals of x-ray reports, in any language, dated prior to 1910, or more recent ones, if signed by renowned radiologists. Incidentally, does anybody know who wrote the first x-ray report?

The original x-ray reports received, after being photographed for possible reproduction, will be returned to the sender, if so desired, or else retained for an exhibit. Needless to emphasize that proper source credit would be forthcoming in the event of publication.

Please mail all communications to

Box 293, E. R. N. GRIGG, M.D.,
Champaign, Ill., U.S.A.,
August 25, 1959.

FLUORIDATION

To the Editor:

My attention has just been called to a letter by Dr. C. P. Harrison on fluoridation in your issue of July 15. Surely your correspondent has wandered far afield with Alice in Wonderland and ended with a species of logic based on that of the Mad Hatter's Tea Party.

His argument is that fluoridation of communal water supplies, a proven method of preventing a serious and almost universal malady, caries, should not be adopted because it is what he calls "socialized medicine". Many members of the profession fear the inroads of socialized medicine and perhaps with good reason. But how in the world the communal adjustment of fluorine in water to a normal and healthy level can be called socialized medicine is quite beyond the scope of a normal imagination.

Your correspondent states that if a person is ill and his illness does not constitute a menace to society, he should determine if and how he will be treated. This he calls "private medicine". He neglects to state that caries is widespread and that it undermines health. He fails to observe that fluoridation is not for people who are ill but to prevent illness. He also seems to forget, or is unaware, that fluoridation to be effective must commence at birth. How an infant of even the mature age of three months or so is to determine by whom or how either prevention or treatment is to be administered he fails to explain.

If this type of argument is valid, then filtration of water supplies, pasteurization of milk and the attack on the mosquito for the prevention of malaria and yellow fever should be discontinued at once and all measures for the prevention of disease avoided.

One should be thankful that most of the members of the medical and dental professions believe in fluoridation and that their official societies have endorsed it. Fortunately, bizarre arguments such as those of Dr. Harrison will carry little weight except perhaps with some politicians who might see in this voice crying in the wilderness another vote. For, unfortunately, Dr. Mather is right, fluoridation has become a political issue.

Health League of Canada, GORDON BATES, M.B.,
111 Avenue Road, General Director.
Toronto 5, Ont.,
August 27, 1959.

THE LONDON LETTER

(From our own correspondent)

THE STRUCTURE OF GENERAL PRACTICE

"For the future the battle for health must be fought more and more in the community, with the family doctor as the leader of the clinical team." Such is the view of the Minister of Health as expressed in his recently published annual report for 1958. His report provides an interesting outline of the structure of general practice at the moment in England and Wales. Of the 19,599 doctors practising as principals, over 6000 (6346 to be precise) work in single-handed practice. Of those in partnership, the vast majority (10,621) are in partnerships of two or three; only 395 are in partnerships of six or more. As one would probably expect, there is a higher proportion of large partnerships in rural than in urban areas. Thus, to take partnerships of six doctors and more as an example, 23 of these are in rural areas, 33 in semi-urban areas, and only six in urban areas. The number of assistants in general practice is 1394, of whom 26 are aged 71 or over. During the course of the year just under a third of these assistants became principals. An analysis of the age structure of principals shows that 2956 are aged 35 and over, whilst 737 are aged 66 and over.

FACTS AND FIGURES

The Minister's report contains a mass of interesting facts and figures, demonstrating the scope of the National Health Service. Since the inception of the Service, for instance, over 50 million pairs of spectacles have been supplied, and the demand is now running around 4.5 million a year. The number of patients supplied with hearing-aids during the same period is 629,152, and during 1958 hearing-aid centres were provided with 197,256 new and repaired Medresco aids, just under 4.5 million batteries, and 42,214 individually moulded ear inserts. Incidentally, it is of interest to note that there is still a demand for the old-fashioned auricles, ear trumpets and speaking tubes. At the end of 1958, 10,990 motor and electric tricycles, 3482 hand-propelled tricycles, and 44,578 invalid chairs were in use by National Health Service patients. During the year hospitals purchased 22 million square feet of x-ray film.

MEDICAL EDUCATION

The recently formed Association for the Study of Medical Education is going from strength to strength. At the end of its first year of existence it can boast of 150 individual members and over 60 corporate members, including the medical faculties of many Commonwealth universities. Financial support has been forthcoming in the form of a grant of £2000 a year for five years from the Rockefeller Foundation and the offer of travelling fellowships from the Commonwealth Fund of New York. Two working parties are being set up: one on the teaching of psychiatry, and the other on the structure and function of teaching hospitals. In addition, two research projects are being planned: one a study of the impact of the medical school on the personality of the student, and the other an inquiry into the process of learning. The Association is holding its second conference next month, the subject of which is to be "Methods of Learning and Techniques of Teaching".

THE MAIDA VALE HOSPITAL

The Maida Vale Hospital for Nervous Diseases has always tended to be overshadowed by the world-famous National Hospital for Nervous Diseases in Queen Square, with which it is now amalgamated, but, as Dr. Anthony Feiling points out in the recently published official history of the hospital, it has two outstanding claims to fame. The first is that it was in this hospital that the first operation for the removal of a brain tumour was performed on November 25, 1884 by Sir Rickman Godlee. The diagnosis, of a tumour localized in the cortical matter of the right hemisphere in the upper part of the fissure of Rolando, was made by Dr. A. Hughes Bennett, a son of the famous Hughes Bennett of Edinburgh. The operation was successful although the patient died about a month later of meningitis. In a discussion of the case subsequently at a meeting of the Royal Medical and Chirurgical Society, Godlee referred to "a certain want of care in the preparation of the head as the cause of the putrefaction which produced death".

Most of the pioneer work on clinical electroencephalography was done at the Maida Vale Hospital by Dr. F. L. Golla and Dr. Grey Walter. The hospital's second claim to fame is that the first patient to have a brain tumour located entirely by electroencephalography in the absence of localizing clinical signs was studied and operated on in the hospital. The patient was originally referred to the Maudsley Hospital as a case of schizophrenia. As this diagnosis seemed unlikely the patient was referred to Golla. As a result of his electroencephalographic investigations, carried out in conjunction with Dr. Grey Walter, it was decided to operate on the patient, and a large glioblastoma was found and removed.

WILLIAM A. R. THOMSON

London, September 1959.

OBITUARIES

DR. H. S. ATKINSON, 79, died in Newfoundland on June 19. He was born in Twillingate, Nfld., and went to McGill University, where he graduated in medicine in 1904. Shortly after graduation he moved to Bay Roberts and practised there for over 50 years.

He is survived by his widow and two sons.

DR. J. ALEXANDER M. BELL died at his home in Fredericton, N.B., on August 13. He was born near Sarnia, Ontario, in 1894 and attended school there. His medical course was taken at McGill University, where he graduated in 1918. Immediately after graduation Dr. Bell enlisted in the R.C.A.M.C. In 1919 he began practice at Newcastle, N.B., and in 1938 moved to Fredericton. Dr. Bell held many offices in local and provincial medical bodies and was a past president of the N.B. Medical Society. Since 1953 he was Director of the Provincial Polio Clinic and Health Centre in Fredericton.

He is survived by his widow two daughters and one son.

A.S.K.

DR ALCIDE CHAMBERLAND est décédé à Charny le 29 août 1959 à l'âge de 80 ans. Le défunt avait pratiqué à Montréal pendant 42 ans.

DR. BASIL R. V. CUDDIHY, 54, collapsed and died while swimming on vacation at Loop Beach, Cape Cod, Mass., on July 20. A native of Montreal, he graduated at McGill in 1930. He interned at Jeffery Hale's Hospital, Quebec, and was resident officer at the Laurentian Sanitorium in Ste. Agathe des Monts before opening his own private practice. A specialist in diseases of the chest, Dr. Cuddihy was senior consultant at the Queen Mary Veterans' Hospital and consultant physician at the Royal Edward Laurentian and the Queen Elizabeth Hospitals. He was also medical adviser to the Workmen's Compensation Board. Dr. Cuddihy was a member of the Quebec College of Physicians and Surgeons, of the American College of Chest Physicians and of the American Trudeau Society.

He is survived by his widow, two sons and a daughter.

DR. JAMES WILLIAM LANG, 65, died in Montreal on August 17. Born on Wolfe Island, Ont., he received his medical education at McGill University and graduated in 1923. In the First World War Dr. Lang served in France with the 14th Battalion of the Montreal

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Regiment and was severely wounded at the Battle of the Somme in 1916. For many years he practised in West Vancouver before moving to Trail in 1956, where he practised at the C. S. Williams Clinic. He retired in December 1957 because of ill health.

Dr. Lang is survived by his widow and a daughter.

DR. JOHN RUSSELL NEILSON, 61, died in a Vancouver Hospital on July 6 after a short illness. He served with the Canadian Army in World War I before studying medicine at Toronto University, where he graduated in 1925. Dr. Neilson was Clinical Associate Professor of Surgery at the University of British Columbia, and at the time of his death was President of the Council of the College of Physicians and Surgeons of British Columbia. He was also a past president of the Vancouver Medical Association.

Dr. Neilson is survived by his widow.

DR. L. MAURICE VENIOT, 41, of Bathurst, N.B., died in his office on July 26. He was born in Bathurst in 1917, graduated from Sacred Heart University in 1937 and received his medical degree from Dalhousie University in 1943. For a time he served with the R.C.A.M.C. in Canada and then began practice in Bathurst. He was the only son of Dr. and Mrs. Clarence J. Veniot. His father is one of the N.B. Senators and his grandfather was the Hon. Peter Veniot, one-time Premier of New Brunswick and a Cabinet Minister in the Dominion Parliament.

Dr. Veniot is survived by his widow and six children.

A.S.K.

DR. ALEXANDER M. AGNEW

AN APPRECIATION

The untimely death of Dr. Alec Agnew on August 11, at the early age of 59 and at the peak of his career, has inflicted a severe loss on our community of Vancouver, and indeed on the medical profession of British Columbia. Dr. Agnew stood high in his profession—he was truly an eminent gynæcologist and obstetrician. He was Head of the Department of Obstetrics and Gynæcology of the University of British Columbia's medical school and was a notable teacher. He was a graduate of Toronto (1926) and a Fellow of the Royal College of Surgeons of Canada (1951).

We have known Alec Agnew since he was an intern in 1926-27. He became assistant to Dr. J. J. Mason, who had a large obstetrical and gynæcological practice. After Dr. Mason's death, Alec gradually moved into a front place in this specialty. When the University of British Columbia Medical School was opened in 1950, Alec, who was chief of this department for the Vancouver General Hospital, was the logical choice for Professor of Obstetrics and Gynæcology, and retained this position until his death.

He served as President of the Vancouver Medical Association in 1939-40 and in 1955 was honoured by election as President of the Canadian Society of Obstetricians and Gynæcologists.

He was a quiet, unassuming man, with many friends, and he will be greatly missed by many people. He leaves a family to whom he was a devoted husband and father—and to them we tender our sincerest sympathy in their great loss.

J.H.M.

PROVINCIAL NEWS

BRITISH COLUMBIA

St. Paul's Hospital in Vancouver is giving its fifth Annual Refresher Course for general practitioners on October 28-30 inclusive. This course is approved for general practitioner postgraduate study credits, and is equal to about 18 hours of study. Dr. Edward F. J. Brooks, associate professor of medicine, University of Toronto, and physician-in-chief of St. Michael's Hospital, Toronto, is guest speaker and will take part in the program. Members of the active staff of St. Paul's Hospital will give lectures and clinics; medicine, surgery, obstetrics and pædiatrics will be the departments of medicine covered by the speakers.

The desperate need for hospital beds in Vancouver has led to the presentation of a brief by the Vancouver Medical Association to the Vancouver City Council, calling for more hospital accommodation and the erection of a "chronic" hospital in the city. The press has taken up the subject very vigorously, and representations on the matter are being made to the government. A metropolitan board has been asked for, to study the whole question of hospitals and draw up a program.

Other cities in the province are also suffering from scarcity of hospital accommodation, and will, it is hoped, join Vancouver in its campaign.

A very comprehensive survey of mental health conditions and needs in British Columbia is in progress under Dr. Mathew Ross, medical director of the American Psychiatric Association. He is holding meetings in many parts of the province, and is hearing representations from a great many people interested in mental health matters and working in one capacity or another in this field. He himself, from what he has said, feels that British Columbia suffers from a marked shortage of psychiatrists, and other workers in the field of mental health.

It is clear so far that certain factors are present and demand notice: (1) lack of psychiatric personnel; (2) concentration in major centres, almost entirely; (3) lack of psychiatric beds—there are no definitely psychiatric hospitals, except those in connection with mental hospitals. Schools and out-patient work for retarded or emotionally upset children are needed and there should be more child guidance clinics in more areas of the province.

The variety of briefs presented is proof of the very keen interest that exists, and this enquiry cannot but do good.

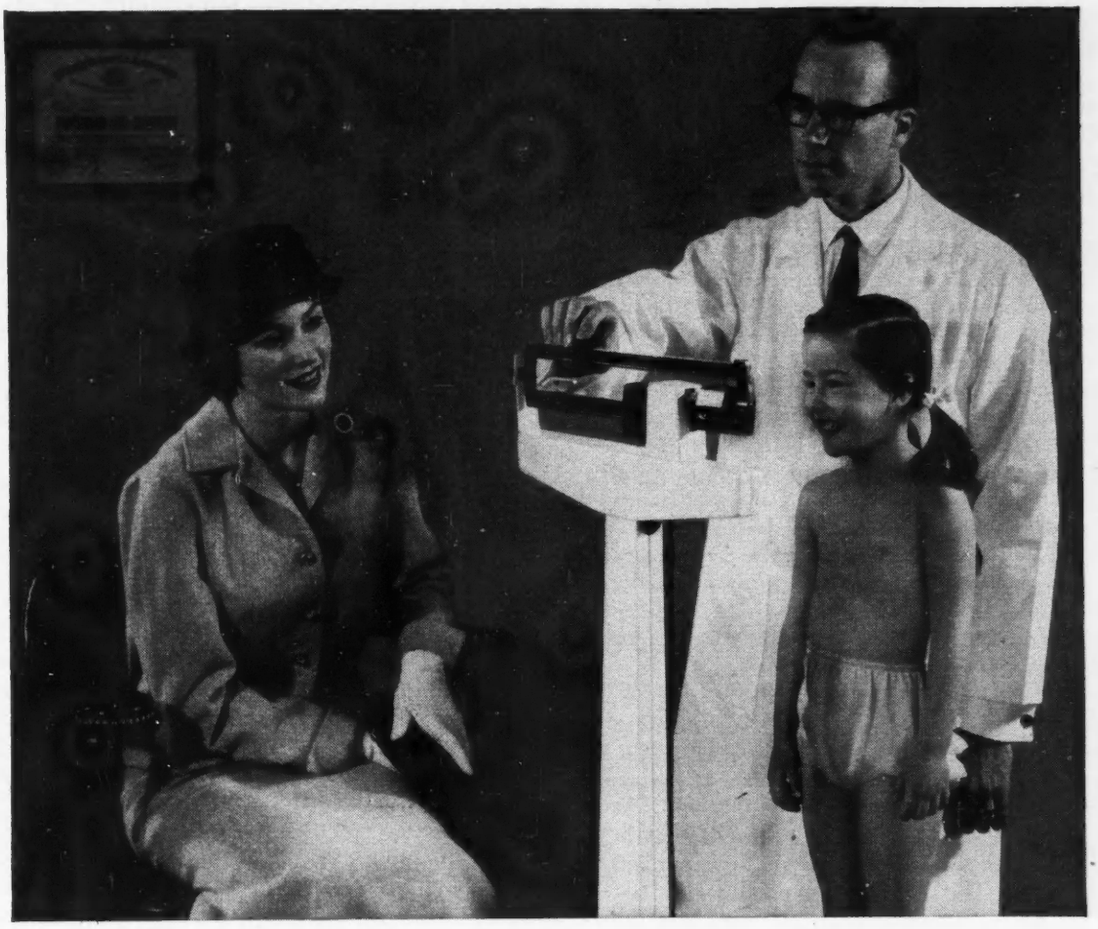
Dr. Ross was appointed by the American Psychiatric Association, at the request of the British Columbia government, to make a complete survey of the mental health problems of the province. He has, in his own words, been given "a free hand to conduct a non-political, non-partisan investigation".

J. H. MACDERMOT

SASKATCHEWAN

Mr. John Charnley, of the Department of Orthopædics, Manchester Royal Infirmary, will be the special guest lecturer at a postgraduate course in orthopædics

(Continued on page 606)



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*Brown, S. S.; Libo, H. W., and Nussbaum, A. H.: Norethandrolone in the Successful Management of Anorexia and "Weight Lag" in Children, Scientific Exhibit presented at the Annual Meeting of the American Academy of Pediatrics, Chicago, Oct. 20-23, 1958.

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(Continued from page 604)

planned for the University of Saskatchewan on January 13 and 14, 1960. This course will be devoted to a discussion of the management of injuries of bones and joints, workmen's compensation problems and rehabilitation. Suitable demonstrations of matters under discussion will be provided. This course is aimed at the general practitioner.

Three federal grants, totalling $143,799, have been awarded to the province of Saskatchewan to assist in hospital construction. A grant of $67,433 was made to assist with the addition to the hospital at Melfort. The new construction will provide space for a board room, staff lounge, dispensary, public health facilities, major and minor operating rooms, supply room, physicians' lounge, medical records room, offices, solarium, and an emergency out-patient treatment room, together with 33 additional active treatment beds. A grant of $46,953 will aid in the construction of a new hospital at Rose Valley to provide space for 20 active treatment beds, seven bassinets and related facilities. Construction is expected to be completed by next summer. A federal grant of $29,413 was made to assist in the construction of a new health centre in North Battleford. It is expected that the building will be ready for occupancy by November.

The University of Saskatchewan has announced a building program for university facilities at Saskatoon, Regina and Emma Lake which in the next five years will necessitate an expenditure of $14,000,000. At the same time, university authorities disclosed that in the next year a national campaign will be launched to raise $2,500,000. The fund will be known as the "University of Saskatchewan Golden Jubilee Fund". The university is observing its 50th anniversary this year. A third announcement noted that the provincial government had agreed to match "dollar for dollar" all contributions to the Jubilee Fund up to the amount of the $2,500,000 objective, and had agreed that "in addition, the government's annual capital grants will be at least as generous as in the past."

This program is necessitated by the anticipated 100% increase during the next five years in student enrolment. This is the first time in the 50-year history of the University of Saskatchewan that it has made a public appeal for funds on this scale. The university's capital projects fall into seven categories: new teaching buildings, teaching building conversion, student services, research, major renovations, general services, and campus improvements and renovations.

The proposed items in the various categories in the approximate order in which they will be built are: (1) Teaching buildings (new): engineering addition; Darke Hall addition (Regina); science building or buildings for chemistry, pharmacy and home economics; classroom, laboratory and library building (Regina); Emma Lake Art Camp studies; commerce building; law building; fine arts building (music, drama, art); medical college addition; physics addition, engineering addition (second stage); library addition; and veterinary science addition. (2) Teaching building (conversion): gymnasium to physics (Regina). (3) Student services: additional food services; student residences and junior faculty housing; gymnasium completion and swimming pool (Saskatoon); physical education centre (Regina); Emma Lake cottages and dining hall; Memorial Union Building addition; playing fields; curling rink addition. (4) Research: Medical Research Institute addition; farm buildings. (5) Major renovations: administration building (Saskatoon) and main buildings (Regina). (6) General services: garage building; nursery greenhouse. (7) Campus improvements and renovations: replace and renew old services in existing buildings; roads, parking and street lighting; replace and renew existing tunnels; improve and extend water system and sewers; landscaping.

The $14,000,000 expansion program to begin July 1, 1960, is in addition to the present building program. A new animal husbandry building was opened in June and the first wing of the W. P. Thompson biology building and the classroom wing of the arts building was put in use in September. The office block and the lecture theatre of the arts building and the research wing and greenhouses of the W. P. Thompson building will be completed next year.

The four-year expansion program does not include any reference to building for the college of education or the Centre for Community Studies.

G. W. PEACOCK

MANITOBA

The Manitoba Hospital Services Plan has recently announced a further extension of outpatients' benefits under the Plan effective August 1, 1959. In February 1959, outpatient benefits were extended to include electroshock treatments.

The Manitoba Medical Library offers what is believed to be a unique service to rural practitioners. They are entitled to borrow any normally circulating book or periodical for the period it is permitted to circulate, e.g., 7 to 14 days. The library pays postage both ways. A further service of the library is to provide prescribed literature for doctors studying for Fellowship examination.

Dr. Dorothy Hill, late of Witney, England, has been appointed Medical Director of the Portage la Prairie health unit by the Provincial Department of Health and Welfare. For the past year she has been an intern in Misericordia Hospital.

Dr. James H. Brown, late of Dundee Royal Mental Hospital, is now practising in the department of psychological medicine in the Manitoba Clinic, Winnipeg.

Dr. John Simon, formerly of Hungary, is the new staff physician at Clearwater Lake Hospital, The Pas. He is a specialist in tuberculosis.

Dr. Morley Lertzman of Winnipeg has been awarded a $2500 fellowship to provide for research in respiratory diseases and treatment under Dr. R. M. Cherniak, University of Manitoba Medical Faculty. The fellowship was provided by the Manitoba Sanatorium Board and the American Trudeau Society.

On August 26, Dr. T. A. Pincock was honoured by his colleagues when he retired as provincial psychia-

trist. Dr. George Johnson, Health Minister, mentioned the help he had received during his short term in office from the steadying influence of Dr. Pincock and then presented him with a TV set from the group. Dr. George Little spoke of Dr. Pincock's composure which never failed during 15 tense and exciting years in Brandon Mental Hospital. A director of Alcoholics Anonymous stated that Dr. Pincock had started Alcoholics Anonymous 15 years ago and that there were now 950 to 980 members in 33 groups. Dr. H. S. Atkinson, head of the Portage la Prairie home for defectives, called him "an artist in his profession". In reply Dr. Pincock said that psychiatry is most challenging and unlimited in scope, its bounds extending far into the future. In 1921 Dr. A. T. Mathers and he were the only two psychiatrists in government institutions.

Dr. Edward Johnson will succeed Dr. Pincock as provincial psychiatrist. Dr. and Mrs. Pincock are spending a well-earned holiday in Europe. On their return Dr. Pincock will take the post of alcoholism research director at the University of Manitoba.

ROSS MITCHELL

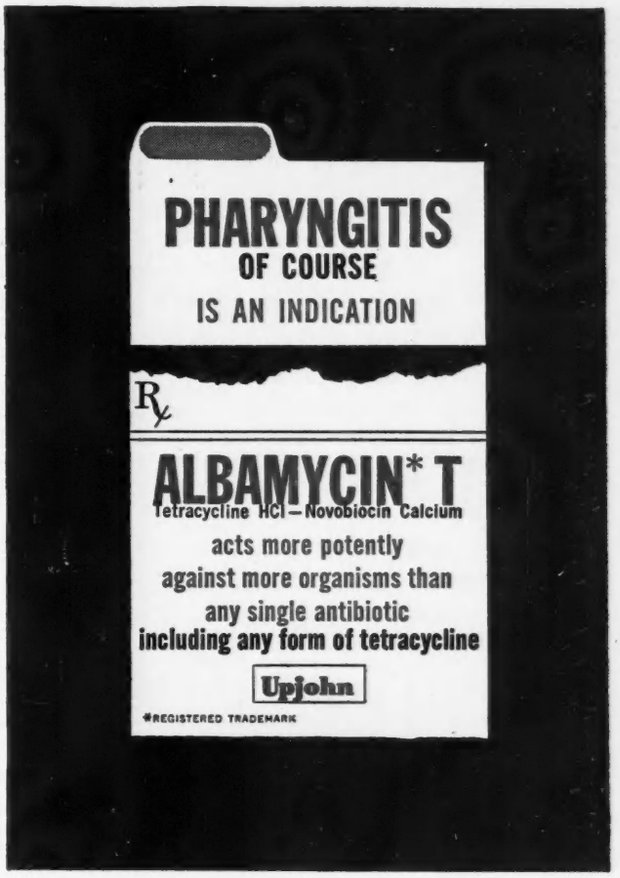
ONTARIO

The Ontario Hospital Services Commission has put out a new quarterly called *Brief*, which is intended to bring general information on the activities, policies and future plans of the commission to those in the Ontario hospital field. The quarterly lives up to its title, for the first issue (No. 1, August 1959) consists of 4 small pages of informative material. In his introduction to *Brief*, Dr. Ian Urquhart, chairman of the commission, says that "initially practically everything in which we were engaged was in the planning or development stage, but now many of our plans have become realities, and we feel we are in a much better position to impart information to those immediately concerned. We are calling this quarterly publication *Brief* as an indication of the manner in which its contents will be presented, for we realize how busy hospital people are and how much reading material they receive every month."

QUEBEC

Montreal hospitals have for several years contended that the operation of an emergency service and out-patient clinics is a public service and that, when patients are unable to pay, compensation should come from public funds. The Montreal Hospital Council and hospitals individually have on many occasions emphasized that they receive no municipal funds to support out-patient clinics where large numbers of indigent patients are treated every day. The first hospital to do something concrete about this situation was Notre-Dame Hospital, which only last month restricted its ambulance and emergency services to emergency calls in the immediate area of the hospital. This was reported in a previous issue.

In this regard, an ever increasing burden has been the traffic accident situation in the Montreal area. All too often individual hospitals are blamed for lack of speedy response to such emergency calls. Following recommendations from the Montreal Hospital Council, the city police department has added 16 ambulance-equipped station wagons to the force. Ten officers and 127 constables have attended a three-day course given at the different hospitals. This is designed to train



patrolmen operating these cars on 24-hour shifts in 14 outlying Montreal districts in emergency treatment of accident and other victims. It gives also an opportunity to familiarize themselves with the hospital buildings before manning the ambulance.

It was hoped that this ambulance service would be in full operation by the time school opened in September. The plan is that 14 of the ambulances will be constantly on the road and two will be held in reserve as a precaution against a major accident. Two constables will travel in each car on an eight-hour per day shift. Each ambulance is equipped with a rigid and a collapsible stretcher, boards for spinal injury cases, a complete first-aid kit and splints, and an oxygen apparatus. The Montreal police department is to be commended for having taken this action, which certainly will relieve city hospitals of an injustifiable burden and improve care of the accident or emergency patient considerably.

In September the Jewish General Hospital of Montreal celebrated its 25th anniversary. The official anniversary program began on September 18, when former interns and resident physicians returned for a home-coming weekend in a scientific as well as social sense. September 20 was open-house day for the public. Exhibitions of medical equipment traced the growth of medicine during the past 25 years, and paintings by staff members were an added attraction. The highlight of the festivities was a banquet at the Queen Elizabeth Hotel. There were awards to staff members who have been with the hospital since the beginning. The speaker at the banquet was the British educator and physician, the Rt. Hon. Lord Cohen of Birkenhead, professor of medicine in the University of Liverpool.

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The Federal Government has recently made a grant of $8000 to the Montreal General Hospital for the inauguration of an 18-month traffic mishap inquiry. The plan is to investigate in minute detail the causative factors in every injury-producing traffic accident which has occurred in Montreal since January 1958. It will be under the direction of Dr. Harold Elliott, and the actual research will be carried out by Dr. C. W. MacMillan of the department of health and social medicine and Dr. G. I. Paul of the department of genetics at McGill. A well worth-while undertaking.

It has been announced by the Montreal General Hospital that Dr. Kenneth T. MacFarlane has been appointed obstetrician and gynæcologist-in-chief. He succeeds Dr. Clifford V. Ward, who has been promoted to the consulting staff. Dr. MacFarlane is a graduate in medicine from the University of Western Ontario, class of 1929. He holds the rank of assistant professor in the department of obstetrics and gynæcology at McGill University.

The National Research Council, Ottawa, which administers the Canadian program of the James Picker Foundation Grant, has named two Montrealers as recipients for the 1959-60 awards. They are Dr. R. A. Beique, department of radiology, Montreal General Hospital, and Dr. Carlton B. Peirce of the Royal Victoria Hospital. The former award is for work on dichromography, a method for quantitative analysis of certain elements; the latter is for work on incident gonadal dose during medical radiological procedures. We wish to join their many friends in extending congratulations.

Canadian medicine has again suffered a great loss, in the passing of Dr. William W. Francis on August 9 at the age of 81. A great medical historian, editor and the cousin of the late Sir William Osler, Dr. Francis was for many years librarian of the Osler Library at McGill. He was principal editor of the catalogue of the "Bibliotheca Osleriana", a collection of some 8000 books relating to the history of science and medicine. His work at McGill alone will stand as a monument to his skill and care.

The new academic sessions at the University of Montreal and at McGill University began last month. Some highlights, kindly made available by Dr. Wilbrod Bonin, Dean of the Faculty of Medicine at Montreal, and Dr. S. M. Bonfield, Secretary of the Faculty of Medicine at McGill, may be of interest.

At the University of Montreal, 114 students have been accepted for the first year and classes started on September 17. A number of senior appointments and promotions have been made. Dr. François Archambault is the new professor of surgical clinic, at Notre-Dame Hospital, and Dr. Jean-Paul Bourque the new chairman and professor of urology. In the department of biochemistry Dr. Louis-Philippe Bouthillier and Dr. Arthur Gagnon have been appointed professors. Dr. Roger Dufresne, formerly professor of materia medica and therapeutics, has been appointed professor of medicine. Dr. Albert Guilbeault is now professor of clinical pædiatrics at Notre-Dame Hospital, Dr. Pierre Meunier professor of gynæcology, and Dr. Fernand Montreuil professor of oto-rhino-laryngology. Dr. Joseph-Luc Riopelle was professor of pathology and has now assumed the chairmanship of the department, succeeding the late Dr. Pierre Masson. Dr. Louis-Charles Simard has been promoted to full professor of pathology. Dr. Paul Poirier has been appointed professor of dermatology, succeeding Dr. Alberic Marin, who is now professor emeritus.

A new sub-department of neuro-anatomy and neurophysiology has been established, with Dr. Louis Poirier its director and full professor. He was formerly a member of the department of histology. In the current year this department will teach first-year students and the first part of second year. After this year the course will be included in the second-year curriculum.

At McGill University, 116 students have been accepted in the first year. Two senior promotions have been announced in the Faculty of Medicine. Dr. Arthur R. Elridge has been made neurologist and neurosurgeon-in-chief at the Royal Victoria Hospital, succeeding the late Dr. William Cone, and promoted to associate professor. Dr. John V. V. Nicholls has been promoted to associate professor of ophthalmology.

During the week of August 24, Professor R. Boucher of the College of Engineering of New York University gave a series of lectures on ultrasonics at the University of Montreal. Dr. Boucher is well known for his work on collection of air-borne particulate matter by modification of the Venturi principle and by ultrasonic techniques. These lectures were under the joint auspices of the School of Hygiene and l'Ecole Polytechnique, with support of the Quebec Ministry of Health and the Department of National Health and Welfare. At the same university, full details of the two-week postgraduate course in medicine have been announced.

The Quebec Heart Foundation Inc. has just announced this year's awards, a total of 13 and amounting to $37,900. The awards, for research on heart disease, went to the following: Drs. M. Aronovitch and S. Segall of the Jewish General Hospital; Dr. Aurèle Beaulnes, University of Montreal; Drs. P. Cartier and P. Stanley, Hôtel-Dieu Hospital; Dr. A. Johnson, Montreal Children's Hospital; Dr. L. L. Lafleche, Notre-Dame Hospital; Dr. A. J. MacIntosh, Montreal General Hospital; Dr. J. A. Paré, Royal Victoria Hospital; Dr. J. H. Quastel, Dr. J. Wener, Dr. K. I. Melville, and Dr. E. Reininger, all of McGill University; Dr. A. Vineberg, Royal Victoria Hospital; and Dr. J. Bernath, Montreal Institute of Cardiology.

On August 22, the late Maurice Duplessis laid the cornerstone for the new extension to the Queen Elizabeth Hospital in Montreal. In doing so he announced that the province would contribute an additional $400,000 to the hospital's building fund. During the ceremony the Premier also presented a $100,000 cheque from an "anonymous benefactor" to the hospital. The 60-year-old hospital has started a six-floor extension and a nurses' residence, part of a $5,500,000 expansion program. Some $3,600,000 has been raised through public subscription and an earlier provincial grant of $1,000,000. A second campaign for the remaining $1,890,000 is to start this fall.

(Continued on page 610)

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TRADEMARK

(Continued from page 608)

Professor Albert Nantel, in charge of hospital administration courses at the University of Montreal, has been appointed acting administrator of Ste. Jeanne d'Arc Hospital in Montreal. He will carry both responsibilities in future. A. H. NEUFELD

NEW BRUNSWICK

Dr. R. J. Brown of Moncton, regional medical officer for Canadian National Railways, has received a fellowship in the American College of Preventive Medicine.

The New Brunswick government has appointed a new advisory committee to be called the Patients' Care Committee for the Provincial Mental Hospital at Lancaster. The chairman is the Hon. D. D. Patterson, provincial secretary-treasurer. Dr. Stephen Weyman represents the medical profession. Others include several members of the provincial legislature and private citizens who are interested in the problems of mental disease.

Dr. H. R. Ripley, director of the department of radiology in the Moncton City Hospital, has been awarded a fellowship in the American College of Radiology.

The camp for diabetic children again functioned this year on the Belleisle river under the supervision of Dr. R. E. Washburn of Saint John. Children from Nova Scotia and Prince Edward Island joined the group from New Brunswick. A. S. KIRKLAND

NOVA SCOTIA

The Nova Scotia Hospital has recently opened a new brick building which accommodates 235 patients. This building now has 200 inmates, and only the top floor of the institution is to be still occupied. It is planned to use the top floor primarily as an infirmary, and two small wards on this floor will be occupied mostly by the older patients at the hospital.

Colonel Eugene Edward Tieman, O.B.E., C.D., of London, Ont., and Halifax, has been appointed Commandant of the Royal Canadian Army Medical School at Camp Borden, Ontario. Colonel Tieman spent several years at Eastern Command Headquarters, Halifax, and was well known by the medical fraternity here. We congratulate him on his new appointment.

A meeting of the Hospital Institute was held at the Nurses' Residence Auditorium of the Victoria General Hospital on September 22 and 23. This meeting was sponsored by the Nova Scotia Hospital Insurance Commission. Dr. F. B. Roth, Deputy Minister of Health for the Province of Saskatchewan, and Dr. J. B. Neilson, member of the Ontario Hospital Services Commission, were the principal speakers. The Institute consisted of addresses and panel discussions on a wide variety of topics, including the various aspects of hospital and medical staff by-laws, hospital construction and steps to be taken in securing approval of the number of beds in hospitals.

The first fall course of 1959, that in Anæsthesia, opened on September 21 at the Victoria General Hospital. This course was under the auspices of the Postgraduate Division of the Faculty of Medicine of Dalhousie University, in co-operation with the Department of Anæsthesia. The course was of four days' duration.

On September 1, the Children's Hospital occupied the third floor of the recent addition to the Halifax Convalescent Hospital. This unit for the care and treatment of children with infectious diseases contains 28 infant cribs and 10 junior beds or junior cribs, for whichever the demand may be.

It will be operated as an integral part of the Children's Hospital, being staffed and serviced by personnel and facilities of the hospital. The type of case which will be admitted includes acute gastroenteritis, staphylococcal pneumonias and infections, the common infectious diseases, infectious hepatitis, typhoid fever, meningitis and acute pulmonary tuberculosis. The age limits for admissions remain unchanged. Children up to the age of 14 may be admitted. The closing of the old Halifax Infectious Diseases Hospital had presented the Children's Hospital with many problems in infectious diseases. The board of management of the Children's Hospital were very desirous of acquiring facilities for the care and treatment of children with infectious diseases. After prolonged negotiations this has become a reality. The opening of this unit is filling a long-felt need of the Children's Hospital, and the success of the operation can be assured.

WALTER K. HOUSE

OBITUARY NOTE

We regret to announce the death on Friday, September 25, of Dr. W. E. Gallie, the world-famous Toronto surgeon, at the age of 77.

Dr. Abraham Flexner, whose 1910 report on American medical schools was a milestone in American medical education, died on Monday, September 21, at the age of 92.

FORTHCOMING MEETINGS

CANADA

CANADIAN OPHTHALMOLOGICAL SOCIETY (SOCIÉTÉ CANADIENNE D'OPHTALMOLOGIE), Annual Meeting, Sheraton-Brock Hotel, Niagara Falls, Ont. (Dr. R. G. C. Kelly, Secretary, 90 St. Clair Avenue West, Toronto 7, Ont.) October 6-8, 1959.

CANADIAN OTOLARYNGOLOGICAL SOCIETY (SOCIÉTÉ CANADIENNE D'OTOLARYNGOLOGIE), Annual Meeting, Sheraton-Brock Hotel, Niagara Falls, Ont. (Dr. Donald M. MacRae, Secretary, 324 Spring Garden Road, Halifax, N.S.) October 9 and 10, 1959.

INDUSTRIAL MEDICAL ASSOCIATION OF THE PROVINCE OF QUEBEC, Annual Conference sponsored jointly with the Section of Industrial Medicine of the Ontario Medical Association, Ste-Adèle-en-haut, P.Q. (Dr. Lloyd Birmingham, Secretary, Suite 214, 1538 Sherbrooke St. West, Montreal 25, P.Q.) October 14-16, 1959.

THE CANADIAN SOCIETY FOR THE STUDY OF FERTILITY, Annual Meeting, Queen Elizabeth Hotel, Montreal, Quebec. (Dr. Jean F. Campbell, Secretary-Treasurer, 238 Queen's Ave., London, Ont.) October 23 and 24, 1959.

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amount injected	duration of penicillinemia
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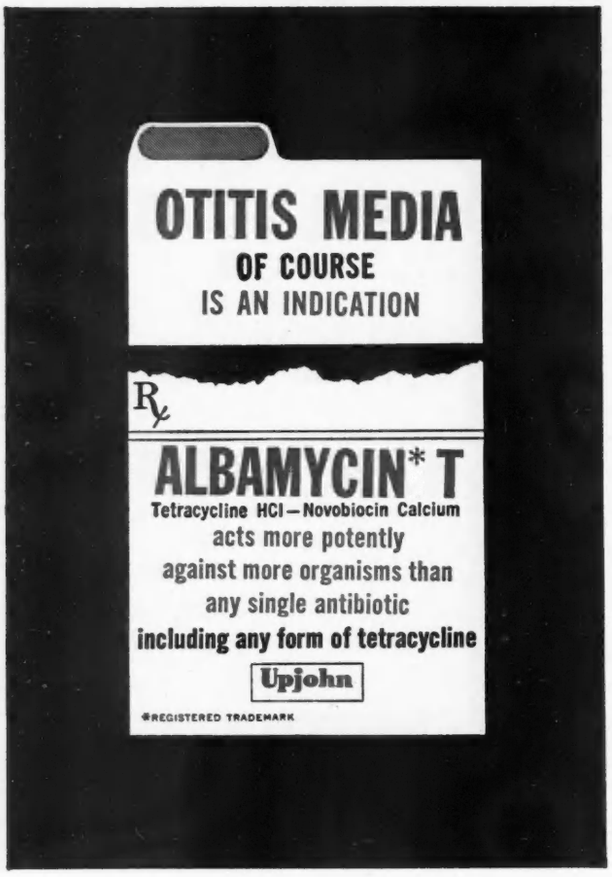

BOOK REVIEWS

TUBERCULOSIS AND OTHER COMMUNICABLE DISEASES. Edited by J. Arthur Myers, University of Minnesota. 499 pp. Illust. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1959. $16.00.

This is a thoroughly up-to-date text on communicable disease, stressing the often forgotten fact that tuberculosis still ranks high among the devastating infectious diseases. While good contagious disease technique has been accepted and long practised for other infections, the author deplores its inadequate employment in tuberculosis. The treatise on tuberculosis is practical from the epidemiological and therapeutic aspect. Explanation of immunity and sensitivity is lucidly presented. The reasons for, and desirability of, wide-scale tuberculin skin testing supplementary to, and in place of, mass x-ray screening are ably given. On the basis of pathogenesis and natural course of the disease every possible avoidance of primary infection is reasonably advised. In the handling of this subject a commonsense approach to epidemiological and public health problems as well as to those of diagnosis and treatment is given.

The several other authors present a fairly complete current review of common communicable diseases with special reference to those of viral causation. In the section on respiratory illnesses, a plea is made for a more critical appraisal of routine prophylactic use of antibiotics in non-bacterial infections. A practical chapter on poliomyelitis deals with treatment of the acute phase, management throughout and modern aspects of rehabilitation.

This is altogether a very readable, informative text on communicable diseases which, though concise, is sufficiently comprehensive.

THE INNERVATION OF MUSCLE: A BIOPSY STUDY. C. Coërs, Chief of the Department of Neurology of the Medical Clinic, Hôpital Brugmann, Brussels University, and A. L. Woolf, Consulting Pathologist, Midland Centre for Neurosurgery, Smethwick, England. 149 pp. Illust. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1959. $10.75.

Seldom, if ever, has this reviewer met a more straightforward and praiseworthy book concentrating on one limited field of study. Describing with taste and simplicity their own important discoveries and those of others, the authors reveal a new world for pathologists, most of whom heretofore have ignored or handled with diffidence diagnostic problems posed by muscle biopsies. The attitude of pathologists in the past has stemmed from ignorance. Ignorance has created poor techniques of taking muscle biopsies and also of staining them. Faced with generally atrocious slides, the novice has become disinterested, even cynical.

The work of Coërs and Woolf should change all this if pathologists will read this book and apply its lessons. At last, neurologists and pathologists can learn something worth while from muscle biopsies. Both of these groups cannot in true conscience ignore this book. But, just as important, they will enjoy reading it and using it.

BIOCHEMISTRY IN RELATION TO MEDICINE. C. W. Carter, R. V. Coxon, D. S. Parsons and R. H. S. Thompson. 628 pp. Illust. 3rd ed. Longmans Green and Co., New York; J. B. Lippincott Company, Montreal, 1959.

This book has always been oriented towards the medical student or the older physician wishing to refresh his knowledge of biochemistry. It therefore omits much detail of theoretical biochemistry and confines itself strictly to the applications of the subject to medicine. In the present edition, the practical exercises which used to be a feature of the book have been omitted, in order to make way for material designed to broaden the base of the book. With the intention of preserving and amplifying the physiological approach to biochemistry, the new authors have included sections on the nature of digestive secretions and the mechanisms of intestinal absorption, and lengthened the sections dealing with the endocrines. The chapters on electrolyte balance and renal function have also been augmented.

AN ESSAY CONCERNING THE CAUSE OF THE ENDEMIAL COLIC OF DEVONSHIRE. George Baker, Physician to Her Majesty's Household. Printed by J. Hughs, near Lincoln's Inn Fields, London, M DCC LXVII. Reprinted by the Delta Omega Society. 60 pp. Distributed by the American Public Health Association, New York, 1958. $5.00.

Most medical people have heard of the Devonshire colic caused by lead in cider, but until they read this facsimile reproduction of Baker's original essay they will be deceiving themselves with a very inadequate knowledge of a very remarkable study, and they will be depriving themselves of an evening's delight. Medicine is under a great debt to the Delta Omega Society for such a beautiful reproduction of this gem, appropriately dedicated to the memory of Dr. Wm. H. Welch with a fitting introduction by Dr. Huntington Williams. It is an essay that fully merits its reproduction after nearly two centuries. It is fascinating and can be read in less than an hour, never to be forgotten.

(Continued on page 614)

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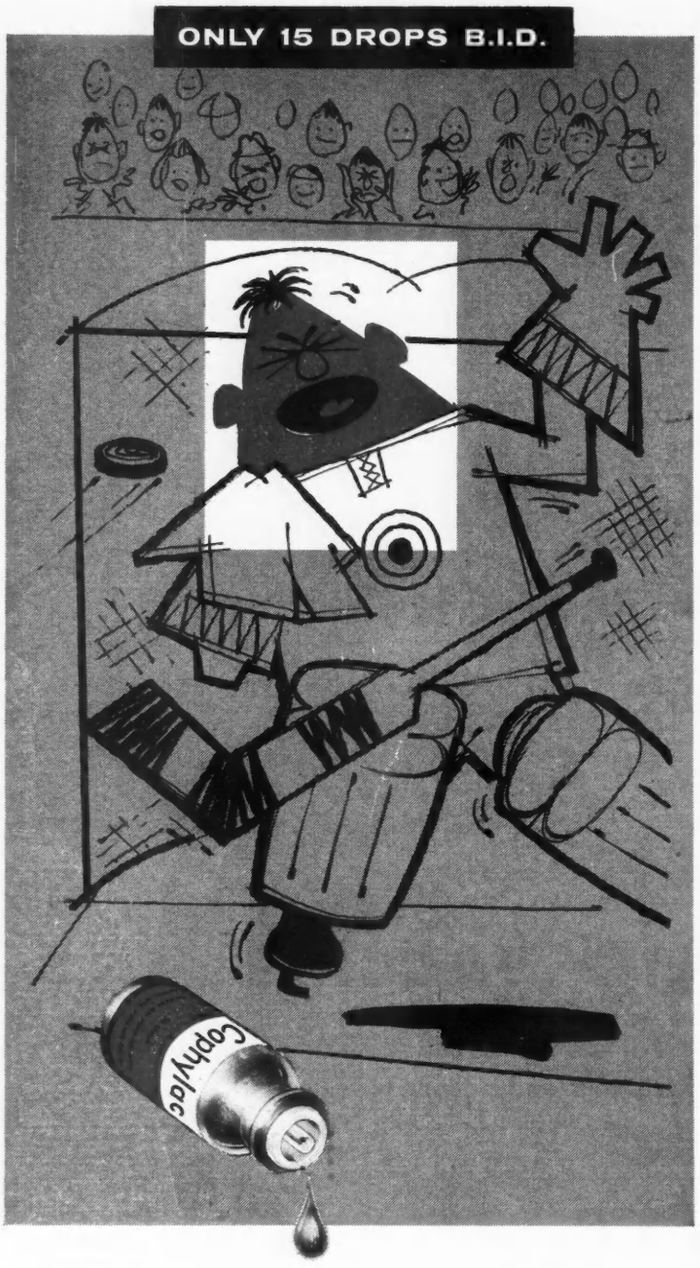

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(Continued from page 612)

CRANIO-CEREBRAL TOPOMETRY IN MAN. A. Delmas, Faculté de Médecine de Paris, and B. Pertuiset. 408 pp. Illust. Masson & Cie, Editeurs, Paris; The Ryerson Press, Toronto, 1959. $42.25.

This text provides quantitative data concerning the variations in form and location of certain structures, cell masses, etc., of the human brain. The location of each structure is given in terms of its distance from each of three selected planes of reference. Thus the data can be used to pinpoint a structure using a stereotaxic instrument.

The feature of this work is the demonstration of a correlation of form and location with the cephalic index. Thus allowance can be made for variation in the shape of the head. Serial sections of 28 heads were used in this study, and the data are analyzed statistically and the methods explained.

In addition to providing quantitative data, the text contains a complete set of serial sections in the horizontal, sagittal and frontal planes respectively. These unstained sections at intervals of one and four millimetres alternately are reproduced full-size. Each is accompanied by a line drawing showing the structures visible with a hand lens. A description of each of these structures, pleasingly lucid, is given in a chapter in which they are catalogued alphabetically.

The text of each page is given in both French and English.

DIFFERENTIALDIAGNOSE NEUROLOGISCHER KRANKHEITSBILDER (Differential Diagnosis of Neurological Clinical Conditions). G. Bodechtel, University of Munich. 975 pp. Illust. Georg Thieme Verlag, Stuttgart; Intercontinental Medical Book Corporation, New York, 1958. $28.60.

Differential diagnosis of neurological diseases is based on the knowledge of their pathogenesis, as Bodechtel, professor of medicine in the University of Munich, states in the preface. Pathogenesis can be understood only from the point of view of modern pathophysiology, which is part of internal medicine. Consequently the book deals with disease entities and their differential diagnosis. Localization is not the leading viewpoint as in textbooks written by neurologists.

The first part by Bodechtel on diseases of the peripheral nervous system (polyneuritis, diseases of the individual peripheral nerves), based evidently on great personal experience by the author, is the most detailed one to appear in the German literature for many years. The second part on the central nervous system deals in separate chapters with circulatory disturbances, inflammatory diseases, including syphilis, and space-occupying lesions. The chapter on brain tumours by Bodechtel is excellent and a source of instructive reading for students, general practitioners and neurologists. There follow chapters on metabolic disorders, malformations, intoxications and, particularly interesting, a chapter on iatrogenic diseases of the nervous system by Wild, dealing with damage produced by injections, spinal punctures and similar procedures. The third part, "Frontiers of neurological differential diagnosis", comprises diseases of the muscles, the skull and spine and endocrine disorders. Chapters on headache, unconsciousness and cerebral seizures follow under the heading of leading symptoms. Part five on ancillary investigations comprises chapters on spinal fluid, electrodiagnosis and electroencephalography.

This is a comprehensive and instructive work, useful for neurologists, psychiatrists, and any medical reader interested in the difficult field of neurological differential diagnosis. Print and illustrations are excellent. The bibliography contains numerous references, mainly to publications by German workers. Important Anglo-Saxon and French papers, however, are not entirely missing.

PROTECTION IN DIAGNOSTIC RADIOLOGY. Edited by B. P. Sonnenblick. 346 pp. Illust. Rutgers University Press, New Brunswick, New Jersey; The Ryerson Press, Toronto, 1959. $7.50.

The editor has set out to produce a volume on radiation hazards associated with diagnostic radiology in medicine and dentistry, and has succeeded most admirably in accomplishing this objective. The volume is made up in the main of a very considerable number of original articles which have been published in the leading radiological journals, radiation research articles, and articles on biological effects of radiation and a number of articles on the genetic effects of radiation. As well as a number of articles by the editor himself, the book contains articles by leading professors of radiology and biology, radiation physicists and radiation research workers. The text is divided into 14 main sections, including the nature and extent of the problems of radiation protection, earlier notable reports on diagnostic radiological protection, non-radiologists and fluoroscopy, protection problems in office practice, maximum permissible dose-levels, dose to patients and personnel in diagnostic x-ray procedures, radiology in obstetrics, dental radiology, image intensification, protection from radio-isotopes, gonadal-dose estimation, radiation in human heredity, natural sources of radiation exposure and radiation control. The author has gathered together in one book the outstanding articles on the whole subject of hazards of radiation in diagnostic radiology and the methods of diminishing these hazards. An extensive bibliography on all of the above items is appended to the book for those who wish to do further reading on one particular phase of the work.

The text contains in one volume, well indexed, all pertinent information required by radiologists and by dentists for control of radiation hazards in diagnostic radiology in medicine and dentistry, and knowledge of how radiation hazards may be very greatly reduced by very simple procedures. Not only should the text be in the library of every practising radiologist and every dentist using radiological equipment but it is an excellent text for teaching of residents and education of the medical public in the control of radiation hazards and their reduction to an absolute minimum in keeping with the value of information obtained by radiological diagnostic methods.

FOOD INSPECTION NOTES. Harry Hill and Ernest Dodsworth. 128 pp. Illust. 5th ed. H. K. Lewis & Co. Ltd., London, 1959. 10s. 6d.

Public health officers and sanitary inspectors will find this a handy guide to the inspection of foods. The book is small and slim and can be carried around in the pocket. Most of it is concerned with the inspection of meat, but other foods are dealt with, and there are short sections on food poisoning and food sampling. A great amount of information has been condensed into a very small amount of space.

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VIRAL AND RICKETTSIAL INFECTIONS OF MAN. Edited by Thomas M. Rivers. 967 pp. Illust. 3rd ed. J. B. Lippincott Company, Philadelphia and Montreal, 1959. $8.50.

The third edition of this authoritative work has been prepared by 44 contributors, each well known in the field and specially qualified to discuss the particular subject allotted to him. In view of the many developments in the period of six years since the second edition, the authors have not endeavoured to give us a revision but have felt it essential to prepare a completely new book. Pertinent new chapters deal with such subjects as "biochemistry of the virus-infected cell", "virus-host cell relation", and "chemotherapy and virus infection", as well as ECHO viruses and adenoviruses. The original chapter on poliomyelitis has been expanded to three.

The editors state that the book was designed to provide comprehensive information relative to viral and rickettsial infections for graduate students of biology, including those preparing for a career in medicine. They have undoubtedly succeeded in producing just such a book! As well, it will certainly prove of great value to physicians and investigators in the microbiological field.

PRACTICAL DERMATOLOGY. George M. Lewis, New York Hospital. 363 pp. Illust. 2nd ed. W. B. Saunders Company, Philadelphia and London, 1959. $8.00.

The first edition of this book was a valuable addition to dermatological literature, serving students as an authoritative introduction to the subject and practitioners as a handy office reference. In a small volume the author has achieved remarkably broad coverage of the entire field of dermatology. All but the rarest of entities are described in clear, concise fashion, and with but few exceptions an objective appraisal of the efficiency of therapy has been made.

The second edition contains more photographs than the first and they are well chosen and of good quality. However, one must share the author's regret that production costs prohibit the use of colour photographs, since they would immeasurably enhance the book's teaching value.

The dermatological formulary will be found useful, and to this second edition has been added a chapter on basic sciences. It is the author's hope that the token information in this section may stimulate the reader's scientific curiosity and also emphasize the fact that dermatology, like other branches of medicine, rests solidly on a broad base of fundamental research.

STAR WORMWOOD. Curtis Bok. 228 pp. McClelland & Stewart Limited, Toronto, 1959. $4.50.

This book is brought out as an attack on the current penal system. Thus it is primarily a polemic and has the defects common to polemics—overemphasis, overstatement and occasional failures in accuracy. Perhaps such defects are inherent in all polemical writing and are accepted without undue complaint if the style and matter are not too conducive to boredom. A sprightly style will do much to keep a reader's interest, but unfortunately in this work there is a needless wordiness which almost ensures that the interest of the general reader will be dulled or dissipated.

A rather grisly tale of childhood misfortune, youthful ill-treatment, unpremeditated homicide, a biased court-room conviction and undeserved execution forms the basis of the author's thesis. Circumstantial evidence as a factor to be relied on in determining guilt or innocence is attacked, perhaps with needless savagery. Considerations which may influence the verdict of a jury are shown to be at times not an integral part of justice or even of common decency.

As the author has had a long experience in law, his description of the behaviour of counsel for the defence or for the prosecution is probably within the bounds of the possible. Whether or not such behaviour of lawyers in the actual conduct of a criminal trial, as here given, is of frequent occurrence is another matter. When the author enters the territory of the medical men, he does not move too surely or venture far. Like many writers of today, he seems to be fascinated by the jargon of the psychologists, and perhaps the charitable thing to be said of him is that he does not further muddy the water. His interpretations are just as questionable and just as bizarre as those of any of the dedicated psychologists.

Any estimate of the number who may find the work interesting can only be conjectural. Undoubtedly there will be some who can convince themselves that they are much the better for mastering its contents. However, those who have not found the time or the inclination to give it intensive study should not be looked on as culpably ignorant.

THE PRESERVATION OF EYESIGHT. Edited by Sir Arthur Salusbury MacNalty, formerly Chief Medical Officer of the Ministry of Health and Ministry of Education, U.K. 107 pp. Illust. John Wright & Sons, Ltd., Bristol; The Macmillan Company of Canada Limited, Toronto, 1958. $2.15.

The preface states that the purpose of this book is to recount in fairly simple language the care and precautions necessary to maintain and keep good eyesight. The book is intended to fill a need among ophthalmic surgeons, general practitioners, medical students, nurses, health visitors, health educators and school teachers, and others concerned with the prevention of disease and the maintenance of public health.

The outline of the work is sufficiently comprehensive for it to include most areas of preventive eye care, as well as brief sections on the anatomy and function of the eye and on the care and rehabilitation of the blind in the United Kingdom.

In so far as it will make lay people more conscious of the importance of routine medical eye examinations and of early examination for seemingly trivial symptoms, it may serve some useful purpose. But it contains too much that is sketchy, inaccurate and misleading for it to fill the need for which it was intended.

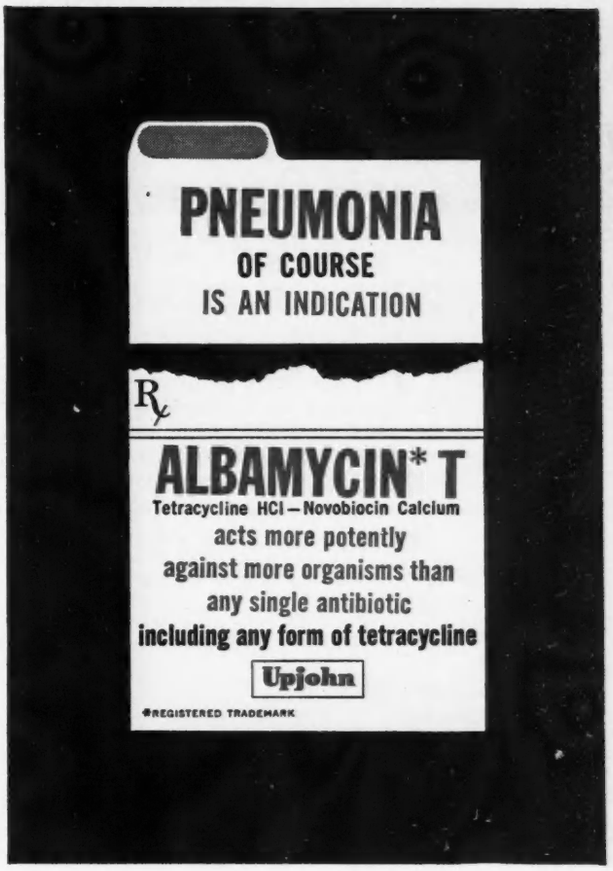
NEUROLOGICAL AND PSYCHOLOGICAL DEFICITS OF ASPHYXIA NEONATORUM. Edited by William F. Windle. 336 pp. Illust. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1958. $8.75.

The role of anoxia of the newborn in the production of mental retardation and cerebral palsy is still not well understood but it is undoubtedly of the greatest importance. This symposium, edited by Dr. William F. Windle, is a very useful account of the clinical and experimental data upon which our present knowledge is based. It is a most valuable book for anybody interested in this field and has, in addition, an extensive bibliography.

THRILLS AND REGRESSIONS. Michael Balint, University of Cincinnati. 148 pp. International Universities Press, New York, 1958. $4.00.

This monograph tells a meandering story of the primal relationships of men to space and time. The author, a psychoanalyst and a neologist with self-confessed guilt, perpetrates another couple of words to add to the psychiatric jargon: ocnophilia and philobatism. The ocnophil is the person who clings to objects (people), substances and generally solid matter and denies or avoids the space and time which surround them and which necessitate his journey from one object to another, e.g. my pen-hand-mind journey in time and over the white expanse of blank paper to cover this review. The philobat enjoys the journey itself and his skill in avoiding obstacles, e.g. a skier hurtling himself into the space down slopes, or the mathematician climbing unknown peaks. The philobat seeks thrills: new foods, conquests. He enjoys funfairs with their lollypops, shooting galleries, giddy round-abouts, peeping shows, gambling and the soothsayers peering into the future. The ocnophil shrinks from such thrills: hugging the earth, the mother, gripping with his hands and mouth. The author relates this to infantile and primitive behaviour.

An amateur philologist, he was at some pains to invent his words. Not until the end of the book does he relate them to Jung's types: the introvert (ocnophilic) and the extrovert (philobatic) or to Freud's types: the narcissist and anaclitic; or to Fenichel's types: the phobic and counterphobic; or to the more ordinary terms: agoraphobia, the fear of empty space (and time) of the ocnophilic, and claustrophobia, the suffocating fear of enclosures of the philobat. The author offers the skier as an example without sufficient knowledge of skiing. Worse, he writes a 140-page book describing thrill-seekers and thrill-shrinkers without even a qualitative analysis of acrobats, divers, inventors, parachutists and other successful philobats, or of their opposite types, or of philobats who failed. His clinical material is weak in this respect. Like so many psychoanalysts, he seems philobatically brave without being ocnophilically wise: he indulges in wild and farfetched analogies and extrapolations, without once stopping for the proofs of experimentation—his own or others. He does not suggest how his inspirations might be validated. Yet in these days of space medicine much is actually known regarding the "break-off" phenomenon: the pilot's feelings and percepts upon breaking off from gravity and immediate space round the earth. Balint uses Freud's term, "oceanic" feeling, for some of these "escape" phenomena from time and space, but he seems unaware of the term "cosmic consciousness", introduced in the last century by a Canadian psychiatrist — Dr. Bucke — which describes to perfection the union between the subject and the world. Yet the author's flashes of insight into children's games, into the "reality" testing of objects; into the genesis of words in different languages; into regressions in childhood and in psychotherapy and how all these relate to space (and the notion of time introduced briefly at the end of the book by Enid Balint) are interesting. The author seems proud that he extends the original all-incorporating idea of orality and genitality, in describing a more fundamental relation to space and time and objects, and that he refuted the primacy of milk as an object—but he seems to lapse, like a good philobat, making for the home-free, safety



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PRINCIPLES OF DISABILITY EVALUATION

By Wilmer Cauthorn Smith, M.D.

Chief Medical Advisor, Oregon State Industrial Accident Commission; Fellow, American Association for the Surgery of Trauma

In the face of the steadily increasing frequency of injuries and malpractice suits, and of the demands upon physicians by insurance companies and individuals for their testimony in court, it is inevitable that standards for disability evaluation should emerge. This book answers the call for universal ground rules that apply to the evaluation of medically ratable injuries regardless of territorial boundaries.

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zone of previous Freudianisms all too often, e.g. flying dreams, floating feelings, typical dreams of water, the healing nature of air, are all representatives of amniotic fluid; and again, the baby's oneness with the penis is the essence of his safety in space.

The reviewer could never understand why certain psychoanalysts, once deciding on flights of fancy in interpreting behaviour in terms of uterine (and even amœboid in the salt water of oceans) experiences, do not go whole hog macrocosmically and describe behaviour in terms of older phylogenetically cosmic experiences, that is, before the creation of our planet. Cosmic imprints before the earth became a planet might explain the pristine genesis of human behaviour in relation to time and space.

Michael Balint's book is one over which the reviewer nodded often, but more in slumber than in approval.

REVERSICON: A MEDICAL WORD FINDER. J. E. Schmidt, National Association on Standard Medical Vocabulary. 440 pp. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1958. $8.25.

In case the reader has never heard of a reversicon, may he be informed that it is a reverse dictionary where the definition precedes the term defined. This book, which contains over 25,000 entries, has been compiled for the purpose of helping the writer who has a concept in mind but who gropes for the right word. Page after page of meanings are listed alphabetically, each followed by the definition (example: Aphasia marked by perversion of musical sense . . . PARAMUSIA, p. 17).

What may look like a promising and original idea at first glance turns out on closer scrutiny to be impractical and mostly useless. It is fair to assume that any specialist (in the broader sense of the word) should be conversant with the vocabulary of his specialty. Words from his specialized vocabulary should come to him naturally and without his having to look them up in such a book. If he cannot define his ideas spontaneously, the chances are that the concepts he wishes to express are not too clear in his own mind—or as is commonly heard, "he doesn't know what he's talking about". This medical word finder contains a large number of words which have been laboriously coined from Greek roots but which are seldom, if ever, seen in medical literature. It is very doubtful, unless they get into wider circulation, that their use would improve the quality of a text. In other words, at what point does specialized technical language stop being a help and start becoming a hindrance?

This book is not devoid of interest, however, and can even provide a lot of fun for all except the dyslexiac.[1] It may even appeal to the streak of pedantry which some of us harbour in our heart's core. Still it is not the book that the physician would wish to refer to in court, where common everyday medical parlance is occasionally frowned upon as being suspected of lygophily.[2] This medical curiosity is unlikely to be much used, although it may help the acataphasic,[3] if not grammatically at least gelotherapeutically.[4]

---

1. Read, person with a low capacity for learning to: DYSLEXIAC (page 315).
2. Darkness, thriving in: LYGOPHYLOUS (page 80).
3. Inability to express one's thoughts in orderly manner: ACATAPHASIA (page 179).
4. Laughter, utilization of, in treating disease: GELOTHERAPY (page 205).

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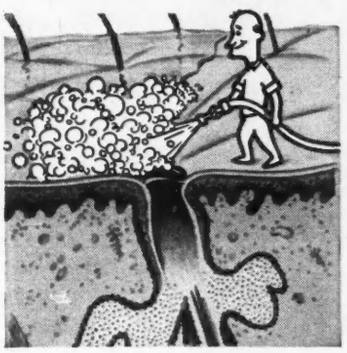

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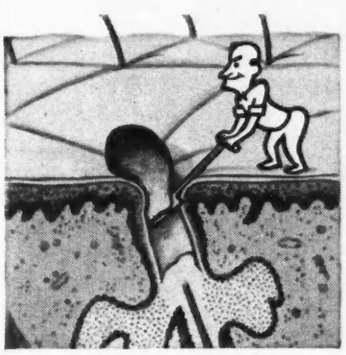

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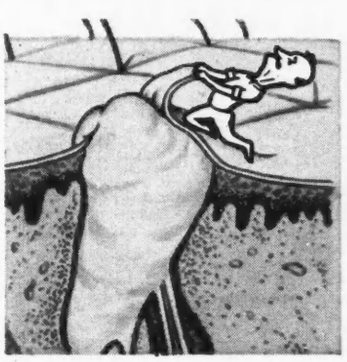

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MEDICAL NEWS *in brief*

(Continued from page 574)

ACADEMY OF PSYCHOSOMATIC MEDICINE

The Academy of Psychosomatic Medicine will hold its Annual Meeting at the Hotel Sheraton-Cleveland in Cleveland on October 15, 16 and 17, 1959. The meeting has been specifically planned for the psychosomatic orientation of the general practitioner, internist, pædiatrician, obstetrician, and other nonpsychiatric physicians. There will be five symposia, on psychopharmacology, anxiety, mental drug therapy, psychotherapy for the nonpsychiatrist, and depression. Panel discussions are scheduled on the psychosomatic aspects of gastro-intestinal, arthritis-neuromuscular, and cardiovascular diseases; obesity, obstetrics - gynæcology, alcoholism, geriatrics, headaches - migraine, pædiatrics, hypnosis, allergy, preoperative and postoperative care, and malignancy. There will be two panels on the newer anti-depressive drugs.

Members of the American Academy of General Practice attending will receive one hour of category II credit for each hour in attendance. Added features will be breakfasts and luncheons, a dinner dance with entertainment, and daily tours and social events for doctors' wives. All interested physicians are invited. Further information from: Dr. Zale A. Yanof, Program Chairman, Academy of Psychomatic Medicine, 2282 Ashland Avenue, Toledo 10, Ohio.

CANADIAN SOCIETY FOR THE STUDY OF FERTILITY

The Annual Meeting of the Canadian Society for the Study of Fertility will take place on October 23 and 24 at the Queen Elizabeth Hotel in Montreal. As usual, world specialists in this field have been invited to address the meeting. Dr. A. J. Cawley will talk on hysterography in the dog, Professor C. P. LeBlond of McGill University will discuss spermatogenesis in the monkey, and Dr. John McLeod, associate professor of anatomy at Cornell University, will deal with post-coital examination in relation to semen quality.

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Dr. Willard M. Allen of George Washington University will present a paper on the use of newer progestational agents in experimental pregnancy in animals, and Dr. Braunstein of the Jewish General Hospital in Montreal will speak on cortisone in clinical practice. The role of gynæcological surgery in inter-sexuality will be discussed by Dr. Howard W. Jones of Johns Hopkins University, Baltimore. Dr. R. B. Greenblatt of Georgia will speak as holder of the Ayerst travelling lectureship. The program also includes the screening of a film on ovulation by Dr. J. B. Doyle of Boston, Mass., and other papers of interest in this field. There will be a banquet on Friday evening, October 23.

Further information from: Dr. Jean F. Campbell, Secretary-Treasurer, Canadian Society for the Study of Fertility, 238 Queen's Ave., London, Ontario.

INDUSTRIAL MEDICAL CONFERENCE

The Annual Conference sponsored by the Industrial Medical Association of the Province of Quebec and by the Section of Industrial Medicine of the Ontario Medical Association will be held at The Chantecler, Ste-Adèle-en-haut, P.Q., October 14-16, 1959. (Reservations should be made directly with The Chantecler.)

The opening session on Wednesday afternoon, October 14, will include papers on measurements of cardiovascular disease in industry, the coronary problem in industry, follow-up reports on acute myocardial infarction in industrial workers, the cardiac in industry, and practical methods of reducing skin disease in industry. Subjects for discussion at the session on Thursday morning, October 15, include opportunities in the field of mental health in industry, the effect of psycho-active drugs on working capacity, and the Arvida placement scheme. At the session on Thursday afternoon, a presentation of medico-legal aspects of industrial medicine will be supplemented by a film, "The Doctor Defendant", and there will be a second paper, on the evaluation of diagnostic procedures for detection of tuberculosis in industry. At the annual dinner on Thursday evening, to be followed by a dance, the speaker will be Dr. Lloyd G. Stevenson, Dean of Medicine, McGill University. Friday morning's program will consist of papers on traumatic and gouty arthritis in industry, rehabilitation in industry, and evaluation of knee disabilities.

Further information from Dr. Lloyd Birmingham, Secretary, The Industrial Medical Association of the Province of Quebec, Suite 214, 1538 Sherbrooke St. W., Montreal 25, P.Q.

POSTGRADUATE COURSES ON DISEASES OF THE CHEST

The Council on Postgraduate Medical Education of the American College of Chest Physicians will present the following postgraduate courses this fall:

14th Annual Course, CLINICAL CARDIOPULMONARY PHYSIOLOGY, Edgewater Beach Hotel, Chicago, October 5-9.

12th Annual Course on DISEASES OF THE CHEST, Park Sheraton Hotel, New York City, November 9-13.

(Continued on page 70)

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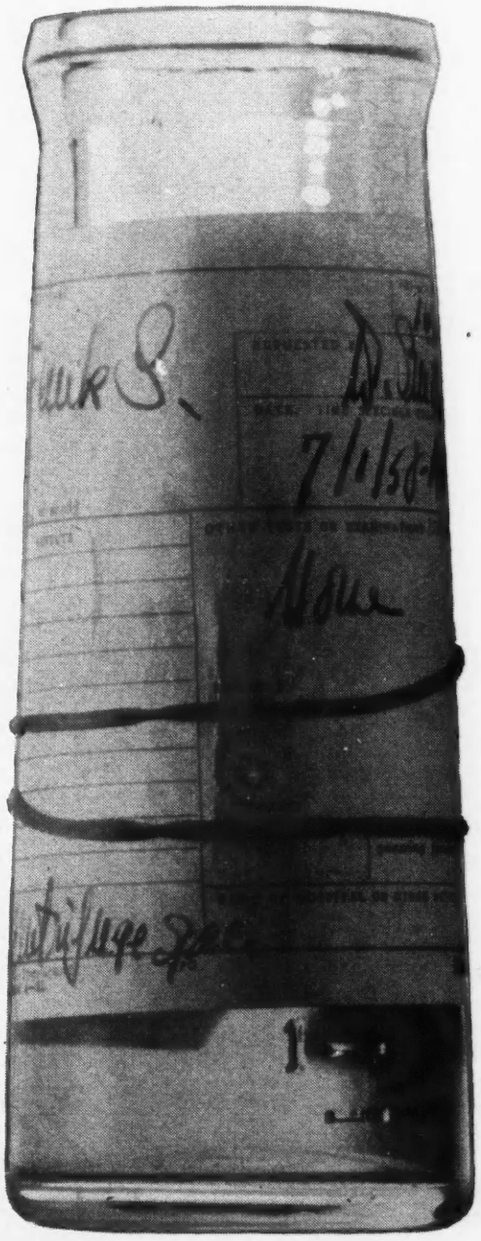


MEDICAL NEWS *in brief*

(Continued from page 62)

5th Annual Course on DISEASES OF THE CHEST, Ambassador Hotel, Los Angeles, December 7-11.

The course on clinical cardiopulmonary physiology is the second to be presented by the Council on this subject. The New York City and Los Angeles courses will offer the most recent advances in the diagnosis and treatment of chest diseases – medical and surgical. Tuition for each course (including round table luncheon discussions) is $100. Further information from: The Executive Director, American College of Chest Physicians, 112 East Chestnut St., Chicago 11, Ill.

POSTGRADUATE COURSES, SCHOOL OF MEDICINE, UNIVERSITY OF BUFFALO

The School of Medicine, University of Buffalo, has scheduled several postgraduate courses for the session 1959-60, listed below. Unless otherwise indicated, the tuition fee for each course is $30.00. Minor Surgery and Office Orthopædics, October 14 and 15; Endocrine Disease, October 28 and 29; Recent Advances in Cardiovascular Disease, November 11 and 12; Dermatology, November 18 and 19; Physical Medicine and Rehabilitation in Clinical Practice, December 2 and 3; Cancer, December 10 (tuition $15.00); Obstetrics, February 24 and 25, 1960; Arthritis, March 2 and 3; Psychiatric Problems in General Practice, March 9 and 10; Evaluation of the Newer Drugs, March 23 and 24; Anæsthesia, April 11-16 (tuition $75.00). For application form and outline of the courses, write to: Department of Postgraduate Education, University of Buffalo School of Medicine, 3435 Main St., Buffalo 14, New York.

CIBA MEDICAL RESEARCH FELLOWSHIP, 1959

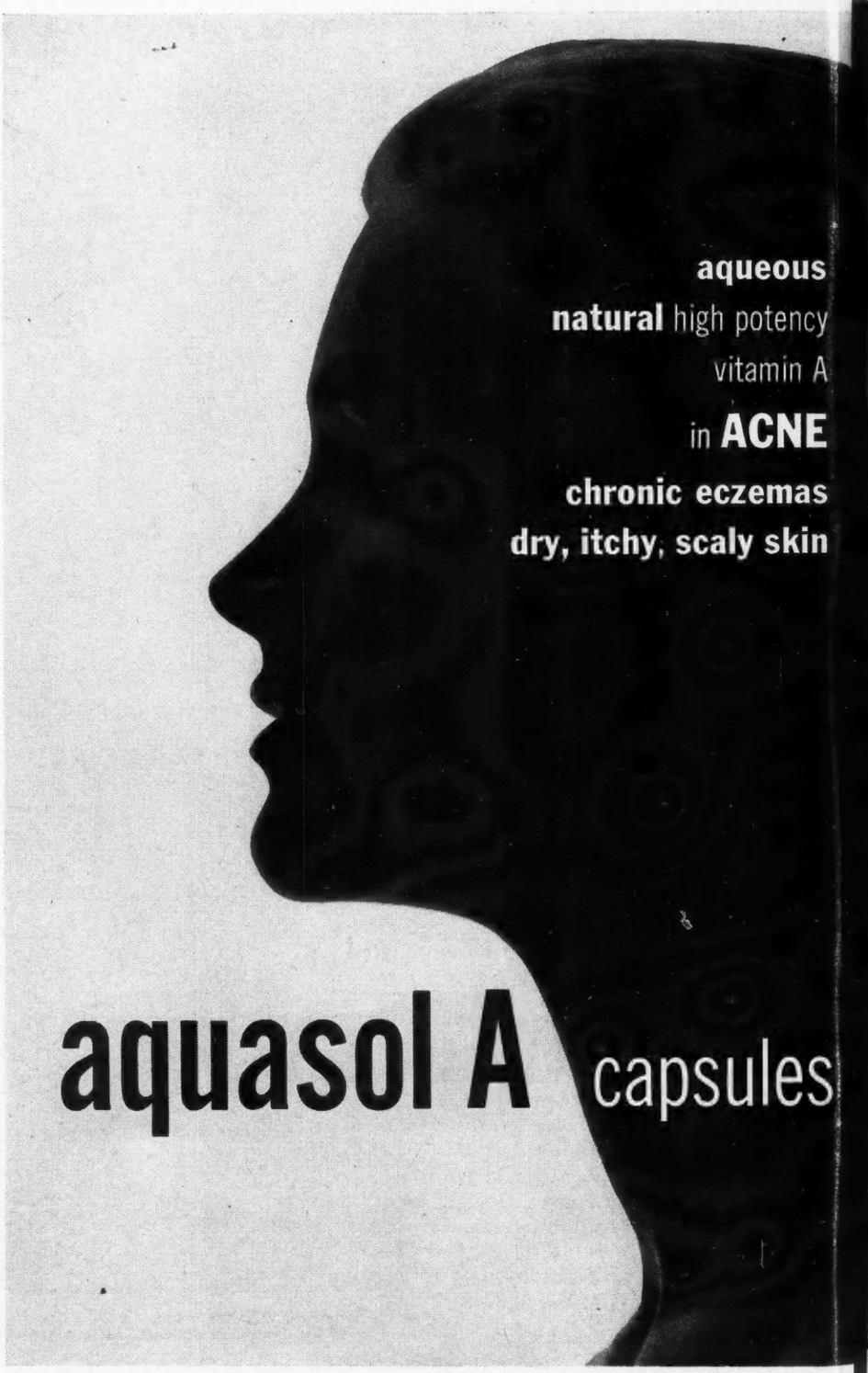
Dr. Joseph Fishman has been awarded the Ciba Medical Research Fellowship, 1959. The Fellowship consists of a grant of $4000, which covers the period from July 1, 1959, to June 30, 1960.

Dr. Fishman graduated from the Faculty of Medicine, McGill University, in 1954. He has taken postgraduate studies at the Jewish General Hospital, Montreal, the Royal Victoria Hospital, Montreal, the Bellevue Hospital, New York, and the McGill University Clinic. During the course of his Fellowship, Dr. Fishman will study the immunological aspects of pituitary hormones.

The announcement of the award to Dr. Fishman was made at a meeting of the Ciba Medical Research Fellowship Committee composed of Dr. J. S. L. Browne, Montreal, Dr. R. F. Farquharson, Toronto, Dr. H. Ettinger, Kingston, Dr. Jacques Genest, Montreal, Dr. Robert Noble, London, and Dr. C. W. Murphy, Montreal.

HYPONATRÆMIA

Patients with œdema and hyponatræmia may differ markedly as regards the basis for the lowering of plasma sodium levels. This is



also undoubtedly true for non-œdematous hyponatræmic patients. Orloff *et al.* (*Circulation*, 19: 284, 1959) point out that one has to analyze the individual situation, listing the possible defects that might lead to inadequacy of water excretion. The primary premise that hypo-osmolarity is always secondary to dilution, that is, retention of water in excess of solute, needs emphasis.

There is evidence that reduction in filtration rate and increased capacity of the proximal segment to reabsorb sodium limit the amount of sodium reaching the diluting segment, thereby providing the basis for inadequacy of water excretion and dilution hyponatræmia. Increased antidiuretic hormone secretion may be another factor involved. Reduction in filtration rate *per se* in certain nephrotics may not be the only cause of hyponatræmia, since diluting capacity per unit of glomerular filtration is normal. Persistent antidiuretic hormone secretion may be required to effect hyponatræmia in some patients.

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1. Davidson, D. D. and Sobel, A. E., Jl. Invest. Derm. 12:221, 1949.

TECHNIQUES OF PULMONARY RESECTION FOR TUBERCULOSIS

Pecora and Brook (*J. Thoracic Surg.*, 37: 446, 1959) review seven years' experience with various types of resections for pulmonary tuberculosis. They state that by judicious use of "open" and "closed" wedge and wedge-segmental resection, a maximum amount of functional lung tissue can be preserved. The post-operative results are determined to a great extent by the amount of disease present. There was no evidence in their series that lobectomy is superior to any other procedure in the treatment of patients with resistant organisms. Bronchial disease is considered to be of little importance, provided adequate antituberculous drug therapy is available. The simplest bronchial closure yields excellent results. In the authors' experience, there is no evidence that pre-resection thoracoplasty is of value; this is in contrast to the opinions of other thoracic surgeons.

PULMONARY ALVEOLAR PROTEINOSIS

In June 1958, Rosen, Castleman and Liebow reported a new clinical entity called "pulmonary alveolar proteinosis". They described it as a chronic disease of the lungs characterized by the specific histological pattern of deposition of a periodic acid-Schiff positive granular and floccular proteinaceous material, rich in lipids, within the distal air spaces, and associated with little if any cellular reaction.

Their paper is reviewed by Moertel and his colleagues (*Proc. Staff Meet. Mayo Clin.*, 34: 152, 1959), who report another case.

Although the histological patterns were consistent in their 27 cases, the clinical patterns varied considerably. It seemed to be a disease of adults, with males predominating 2.5 to 1. The most prominent symptom, and usually the initial one, was exertional dyspnœa. Other common symptoms were productive cough, fever, easy

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MEDICAL NEWS *in brief*

(Continued from page 71)

fatigability, thoracic pain, and loss of weight. Physical signs were remarkably few despite sometimes massive pulmonary involvement. Laboratory findings were nonspecific. The most helpful diagnostic aid short of pulmonary biopsy was roentgenographic examination, which characteristically showed a fine, diffuse, perihilar, radiating, feathery or vaguely nodular soft density with a "butterfly" distribution similar to that seen in severe pulmonary œdema. In no case was enlargement of hilar nodes seen. The clinical course was variable in the cases in which follow-up data were presented: eight patients died because of increasingly severe pulmonary involvement or superimposed fungous infection, five experienced improvement or recovered, and 13 had symptoms that persisted in varying intensities.

Occupational exposure may be an etiological factor in pulmonary alveolar proteinosis. Five of the original 27 patients worked with lumber, four in lumberyards and one as a carpenter.

LIBRARY FACILITIES FOR FOREIGN DOCTORS

The Council of the British Medical Association has announced that the library facilities of the British Medical Association are available to members of Member Associations that hold membership in the World Medical Association.

Foreign doctors who are resident in Great Britain for a period of not more than six months are invited to use the library facilities of the B.M.A. They will be afforded all privileges of these facilities with the exception of borrowing the books. This is an additional project in the program of the Association in fulfilling the objective of the World Medical Association in promoting contacts between the medical profession in different countries.

BORDEN AWARD OF THE NUTRITION SOCIETY OF CANADA

The Nutrition Society of Canada has announced that the Borden Award of the Nutrition Society of Canada will be given annually in recognition of outstanding research work done by one of its members. The first award will be made in June 1960. The recipient of this award, which has been donated by the Borden Company Foundation, Incorporated, must be under the age of 40 years and must have published the meritorious work within the preceding three years. It is hoped that this award will further encourage research activities by younger members of the Society.

AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS, DISTRICT V

District V of the American College of Obstetricians and Gynecologists will hold its annual meeting in the Statler Hilton Hotel, De-

(Continued on page 74)

A compound of the tannate, salicylate, oxide and peroxide salts of titanium in a triethanolamine base, Metanium is a safe point of departure as it is a useful first resort in the dermatologist's repertoire; absolutely bland and nontoxic, its effect consists in the enhancing of phagocytic action of the endothelial cells of the skin. Occlusive and antipruritic, it represents sufficiency in the treatment of mild skin conditions. Wherever antibiotic and steroid medications must or may be withheld, as in work with infants—and upon simple dermatoses Metanium is a useful weapon of therapy. In two forms: powder and ointment. Write for a clinical supply.

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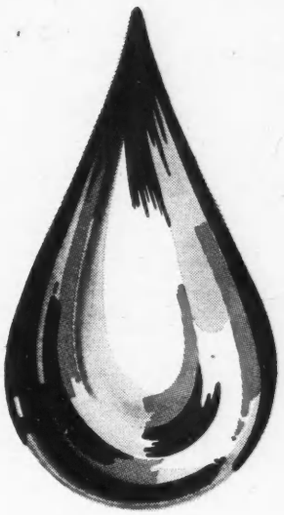

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MEDICAL NEWS *in brief*

(Continued from page 72)

troit, November 18-21. The district comprises Indiana, Kentucky, Michigan, Ohio and Ontario. The scientific program on November 19 and 20 will consist of five panels, eight scientific papers, and two prize award papers by residents in obstetrics and gynæcology. The subjects of the panels are: "The national chemotherapy program and practical cancer chemotherapy in gynæcology"; "Detection and treatment of early pelvic malignancies"; "Obstetrical anæsthesia survey"; "Abortion"; and "Cæsarean section". Canadian contributors to the panels are Dr. R. A. H. Kinch of London, Ont., and Drs. Samuel Norris and S. M. Eisen of Toronto.

The annual dinner dance will be held on Friday evening, November 20. Dr. Laman A. Gray of Louisville will give an historical sketch of Dr. Ephraim McDowell, Kentucky surgeon who 150 years ago performed the first ovariotomy.

Further information from: Dr. Arthur G. King, Cincinnati, District V chairman, 199 William Howard Taft Road, Cincinnati 19, or Mr. Donald F. Richardson, executive secretary, The American College of Obstetricians and Gynecologists, Box 749, Chicago 90.

Dr. Douglas T. Cannell, Toronto, is Ontario Chairman of District V, and Dr. Samuel Norris of Toronto is Ontario Vice-chairman.

—

RADICAL SURGERY IN CARCINOMA OF THE HEAD OF THE PANCREAS

Erik Millbourn from the Centrallasarett of Kalmar, Sweden, claims that he was the first to have performed a pancreatico-gastrostomy (1948). He has since performed radical pancreatic surgery on 15 patients. Diagnosis of cancer of the pancreas is difficult; often it rests with the palpatory findings of the surgeon at operation. Even then, histological examination does not always confirm the clinical impression. In the series reported, 13 cases were operated on in two stages. Four of them had a biopsy in the first stage, which was followed in one case by acute pancreatitis and fat necrosis. It is suggested that biopsy and frozen section at the second stage may be less dangerous.

The first stage usually consists of a cholecysto-jejunostomy and entero-anastomosis. In the second stage after a pancreatico-duodenal resection a pancreatico-jejunostomy or a pancreatico-gastrostomy, or both, are performed. The gastro-jejunostomy must be placed distally to the other anastomoses on the efferent loop. Ligating or suturing the end of the common bile duct should be avoided because it involves the risk of fistula formation. The jejunal stump should be carefully fixed to the posterior abdominal wall in order to prevent invagination. Digestive disturbances usually follow upon total pancreatico-duodenectomy or closing of the pancreatic stump. In one of the author's patients the daily loss of pancreatic juice amounted to almost 500 c.c. His condition remained poor until he was persuaded to drink this juice, which he mixed with beer to mask the

(Continued on page 86)

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1. Lehrer, H. W., et al.: Northwest Med. 75:1249, 1955.
2. Smith, Richard T.: New York Med. 8:16, 1952

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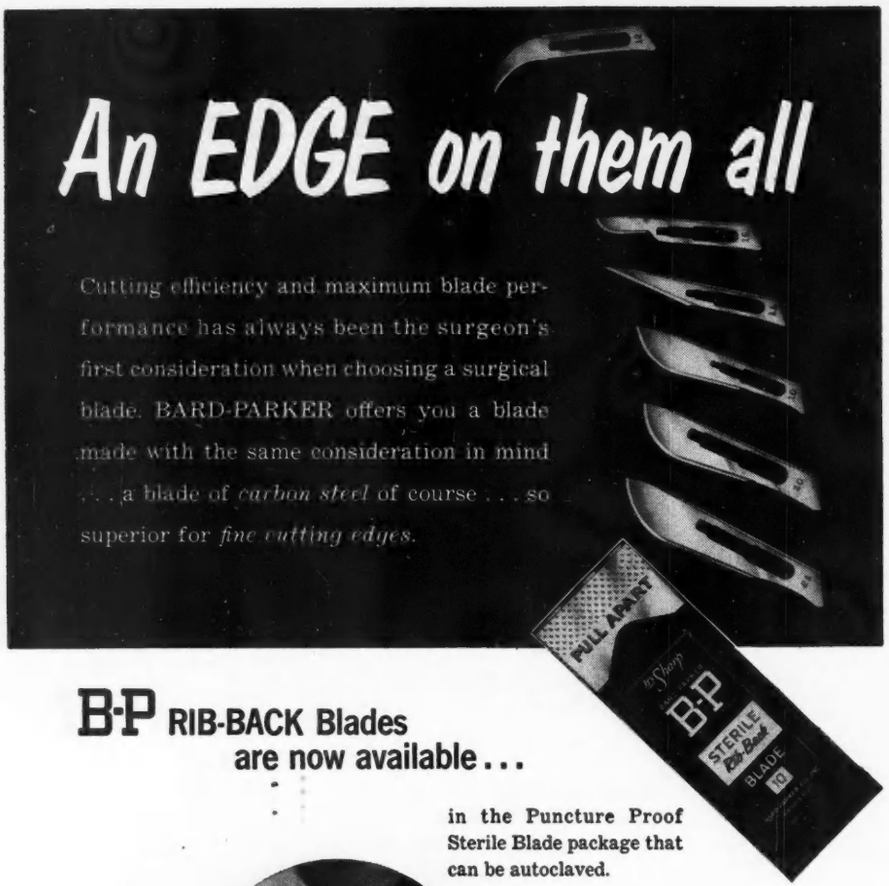
MEDICAL NEWS *in brief*

(Continued from page 74)

taste. Improvement soon followed this drastic measure.

In most cases the coexistence of two sphincterless openings for the bile flow to the jejunum, cholecysto-jejunostomy and choledocho-jejunostomy, does not result in postoperative complications.

In the second part of his series the author's operative mortality was 8%, which is not unduly high when one considers that all of the patients were poor operative risks and many were deeply jaundiced. Two patients, one having a carcinoma of the papilla of Vater, survived almost five years and two others 2½ years. Two patients last seen 3½ and 2¼ years respectively after radical resection are still well. In the author's opinion, radical pancreatic surgery is justified.—*Acta chir. scandinav.*, 116: 1, 1958.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CANADIAN BIBLIOGRAPHY OF EPIDEMIOLOGY

The Epidemiology Division of the Department of National Health and Welfare, Ottawa, has prepared a selected bibliography of references which it considers to be of epidemiological significance. The criteria for inclusion have been publication in a Canadian medical journal or publication by a Canadian author in journals abroad. The period covered by the bibliography is 1950 to 1957 inclusive, and the bibliography is a selective one. References are included under the general headings of accidents, air pollution, Arctic medicine, chronic diseases, communicable diseases and public health services, and the criteria for inclusion seem to have been very broadly taken. Thus for example the bibliography includes three case reports on agammaglobulinæmia, papers on the pathology of atherosclerosis, and an article on the relationship between herpes zoster and leukæmia. It is proposed to issue an annual supplement to this publication, with a complete revision in 1960 and every five years thereafter. The bibliography should be most useful in tracing the work of Canadian authors on these subjects.

ATRIAL SEPTAL DEFECT: FACTORS AFFECTING THE SURGICAL MORTALITY RATE

One hundred and nineteen adult patients who had been operated upon by McGoon *et al.* (*Circulation*, 19: 195, 1959) for closure of atrial septal defects were studied to determine what preoperative findings have an effect upon the patient's ability to survive the operative period. Of several factors so analyzed five are significantly related to survival, namely: (1) a history of clinical congestive heart failure; (2) a markedly elevated right atrial pressure; (3) a large right-to-left shunt; (4) severely elevated pressure in the pulmonary artery, and (5) a markedly increased pulmonary vascular resistance. Each of these pertains to the presence of heart failure or excessive pulmonary vascular resistance. The mortality rate for repair of uncomplicated atrial defects by the atrial-well technique was less than 2% in this series.